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Crashes and Crises

Lessons from a History of Financial Disasters

Course Guidebook

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Duke University



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Connel Fullenkamp is a Professor of the Practice of Economics at Duke University, where he also serves as the Director of Undergraduate Studies for the Department of Economics and the Director of the Economics Center for Teaching. He teaches core economics courses, such as Economic Principles, as well as financial economics courses, such as Corporate Finance. Before joining the Duke faculty in 1999, Professor Fullenkamp was a faculty member in the Department of Finance at the University of Notre Dame's Mendoza College of Business.

Professor Fullenkamp was named a Presidential Scholar by the US Department of Education before earning his BA in Economics from Michigan State University. In addition to receiving the Harry S. Truman Scholarship, he was named one of the university's Alumni Distinguished Scholars. He earned his MA and PhD in Economics from Harvard University, where he also was awarded a National Science Foundation Graduate Research Fellowship.

Professor Fullenkamp has published articles on topics such as financial market development and regulation, the economic and policy implications of risk sharing, and the economic impact of immigrant remittances. His work has appeared in a number of prestigious academic journals, including the *Review of Economic Dynamics*, the *Cato Journal*, and the *Journal of Banking and Finance*. Along with Sunil Sharma, Professor Fullenkamp won the third annual essay contest on financial regulation sponsored by the *Financial Times* and the International Centre for Financial Regulation; their paper was entitled "Good Financial Regulation: Changing the Process Is Crucial." His other publications include "Financial Regulation and the Speed of Financial Risks" and "Reconsidering Bank Capital Regulation."

Professor Fullenkamp also does consulting work for the International Monetary Fund (IMF) Institute for Capacity Development, training government officials around the world. He is a member of the IMF Institute's finance team, whose purpose is to train central bankers and other officials in financial market regulation, focusing on derivatives and other new financial instruments. He is also an educational consultant to *The New York Times*.

In recognition of his teaching excellence, Professor Fullenkamp has received Duke University's Alumni Distinguished Undergraduate Teaching Award as well as the University of Notre Dame's Mendoza College of Business Outstanding Teacher Award.

Professor Fullenkamp's other Great Courses are *Understanding Investments*; *Financial Literacy: Finding Your Way in the Financial Markets*; and *The Economics of Uncertainty*. ■

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CRASHES AND CRISES: LESSONS FROM A HISTORY OF FINANCIAL DISASTERS

This course presents a history of financial disasters—crashes, crises, panics, and scandals that have occurred since the early 1600s. Lectures not only explain why and how these disasters happened, but also introduce you to the people behind many of these events. You will meet John Blunt, whose ambition fueled the South Sea bubble, and John Law, who created the Mississippi bubble when he persuaded the French government to put his untested theories about money into practice. You will also learn about the key role that carousing in taverns played in creating the Dutch tulip bubble.

The course introduces you to some of history's greatest swindlers. You will meet Charles Ponzi, whose fake investment fund conned all of New England, and Ivar Kreuger, the original international man of mystery whose misdeeds inspired Congress to rewrite the securities laws. You will also meet George Graham Rice, a Wall Street operator whose mining stock scams spanned 3 decades. You will learn how reckless bankers, such as Michael Wise at Silverado and Charles Keating at Lincoln, represented the worst excesses that caused the savings and loan crisis. And you will be introduced to modern rogue traders: Jérôme Kerviel at the French bank Société Générale; Nick Leeson, who bankrupted Barings Bank; and Bruno Iksil, who became notorious as the London Whale.

The course highlights how governments also cause financial meltdowns. You will learn how runaway government spending was at the root of hyperinflations in Germany during the 1920s and in Zimbabwe during the mid-2000s. Government spending is also a main culprit behind the currency crashes that have rocked Thailand, Mexico, and many other economies. Several lectures demonstrate how bank regulations have backfired on numerous occasions, leading to crises. For example, regulations intended to protect the banking system actually led to the panic of 1907. In Japan, paternalistic supervision of the banking industry resulted in a so-called bubble economy that caused a decades-long banking and economic crisis when it collapsed. On the other hand, government hesitation and inaction stoked a nationwide banking panic in the early 1930s that economists Milton Friedman and Anna Schwartz called the Great Contraction.

One of the main messages of the course is that crashes and crises are actually part of the normal functioning of the financial markets. In fact, you will learn why the calm financial markets that many people grew up with were a historical exception and the “boom in busts” that began in the 1980s was actually a return to the historical norm. Several lectures exhibit how financial innovations lead to overoptimistic and opportunistic responses that in turn lead to crashes and crises. For example, the innovations in technology that led contemporaries to call the 1920s the “new era” also fueled a stock price bubble that famously crashed in October 1929. This pattern repeated itself in the 1990s, when the “new economy” associated with the commercialization of the internet led to the dotcom bubble. Financial innovation, in the form of computerized portfolio insurance, also played the leading role in the stock market’s crash of 1987.

You will also learn how aggressive financial managers pushed innovative products and ideas too far, leading to huge losses. Companies such as Procter & Gamble lost millions on interest rate swaps created by Bankers Trust. Robert Citron, the manager of the Orange County investment pool, made—and then lost—hundreds of millions of dollars gambling on interest rates using repurchase agreements. And John Meriwether, a calculating arbitrageur, nearly caused a global financial crisis in 1998 when reality trumped the models driving his Long-Term Capital Management hedge fund.

You will also learn how all these factors—human nature, governments, and innovation—came together to cause the greatest financial panic in 2 generations: the subprime mortgage meltdown. The lessons that this course draws from the history of financial disasters are also used to determine where future crashes and crises are likely to originate. The final lecture considers whether China’s rapid financial development, which relies on institutions commonly called shadow banks, could lead to crisis. And technological innovations, including cryptocurrencies and high-frequency trading, are evaluated for their potential to cause tomorrow’s financial meltdowns. ■

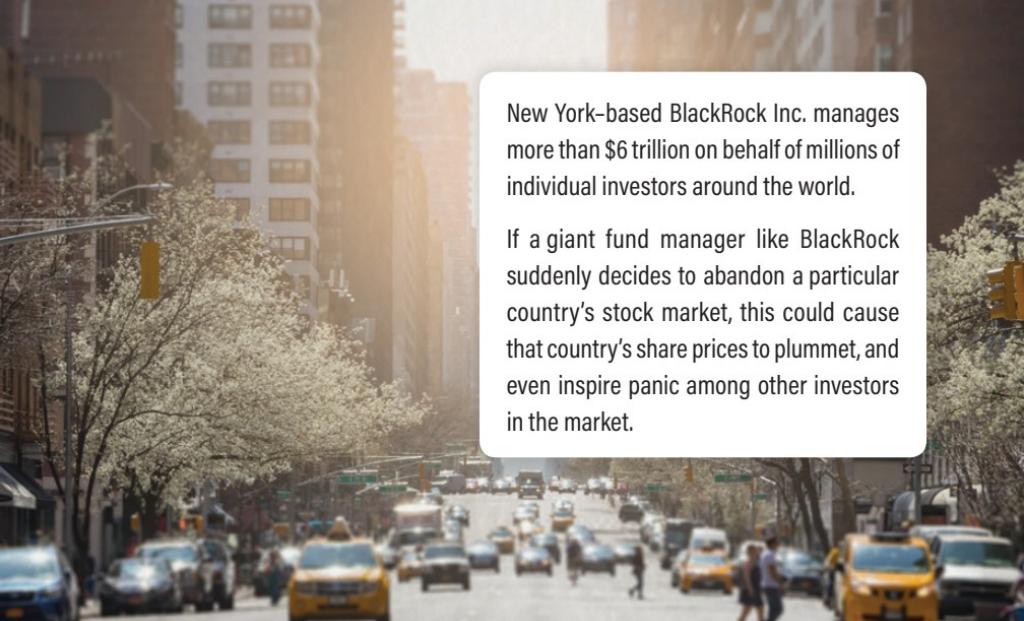
FINTECH, CRYPTO, AND THE FUTURE OF DISASTER

LECTURE 1

Crashes and crises are a normal part of financial activity. Technology may have the potential to reduce, or even prevent, some financial disasters by improving the amount of information available to investors and regulators, but it also creates new ways for people to push the financial system beyond its limits. The human desire to pursue big payoffs will always be the driving force behind financial innovation—and financial disasters. The balance we need to strike is between allowing people to chase these big payoffs through experimentation and innovation while limiting the damage from the recurring crashes and crises that result from it.

FINANCIAL TECHNOLOGY

- ⌚ Crashes and crises will always be a part of the financial markets. They always have been. And we might be able to prevent some disasters, or at least lessen the damage, if we try to anticipate where, and why, the next one will take place.
- ⌚ One likely source of a future financial crisis is technology. It shapes nearly every financial activity—from taking a photograph of a check to deposit it to lending money directly to another person via smartphone app. But technology will most likely not become a leading cause.
- ⌚ Instead, one thing that all financial traumas have in common is the human factor: the decisions that people make. Technology might amplify the consequences—and even empower new decisions that are more dangerous than before—but technology is a tool for carrying out human decisions. And it is human nature for people to make bad decisions, over and over again.
- ⌚ Sometimes, greed or bad incentives are at the root of these crises. Sometimes, people make the best decisions they can and the decisions add up to a calamity, as in the case of portfolio insurance causing the stock market crash of 1987. Furthermore, because of cognitive biases, it's possible that people will make bad choices yet be convinced they're doing the right thing.
- ⌚ One way that technology could make future crashes and crises even more likely is with the electronic systems that people use to trade financial assets. Two main innovations in trading systems make future crises more likely. The first of these is the expansion of trading systems across space and time.
- ⌚ Although electronic trading systems have been around for about a half a century, it's been within the past few decades that society completed a truly global system that trades virtually any asset at any time of day.
- ⌚ The arrival of 24/7 trading vastly increased the global pool of investors. And it's been accompanied by the huge growth of private fund managers that offer mutual fund and pension fund investments to individual investors. These broad trends have been good for individual investors so far, but the chances of massive runs and market crashes have also increased.



New York-based BlackRock Inc. manages more than \$6 trillion on behalf of millions of individual investors around the world.

If a giant fund manager like BlackRock suddenly decides to abandon a particular country's stock market, this could cause that country's share prices to plummet, and even inspire panic among other investors in the market.

- ⌚ The relatively small number of giant international investors also makes it more likely that shocks in one country are transmitted to the financial markets in other countries. This danger has caught the attention of some domestic regulators, as well as the Financial Stability Board in Basel, Switzerland—a forum of 25 developed economies, including the United States and the European Union, as well as the International Monetary Fund, the World Bank, and other large international standard-setting bodies and financial institutions.
- ⌚ Another potentially fraught technical innovation in trading systems has to do with automation. Computing power and know-how have increased so much that sophisticated programs known as trading algorithms, or algos, have become increasingly popular. These trading algorithms are smart, and incredibly fast—able to submit buy and sell orders in microseconds (1 microsecond is a millionth of a second).
- ⌚ High-frequency automated trading has grown to account for more than half of all trading in the US stock market; and even greater shares of specialized markets reserved largely to professionals, including 2/3 of interest rate futures and some treasury futures; and 80% of foreign exchange futures volume. It's also increasingly being adapted to bond markets, as more bond trading moves onto exchanges and other electronic platforms.

- ⌚ High-frequency, automated, algorithm-based trading has already caused several smaller-scale events in markets around the world.
- ⌚ The first to gain notoriety was the so-called flash crash of May 2010, in which the Dow Jones index fell by about 9% within minutes and the prices of some blue-chip stocks dropped almost all the way to zero. Prices bounced back almost as much as they fell, and the market closed down only about 2% on the day—a fairly large drop, but nothing for the record books. Still, the sudden unexplained drop in stock prices, followed by an equally mysterious recovery, had many traders and market observers wondering what happened.
- ⌚ In the years since, there have been other flash crashes, in which relatively large swings in prices or yields occurred over very short time spans—a few minutes to an hour. The events have been investigated by government agencies and individual economists as well as by many of the trading firms themselves. What they've found so far suggests that the culprits behind the big swings in prices were largely human decisions rather than the computers.
- ⌚ Trading technology amplifies human decisions. In the nonstop global market, the decisions of individuals to place their savings with the largest, and safest-looking, fund companies has concentrated the impact that these companies' investing decisions have on market prices around the world. And in the case of algo trading, the trading companies' decisions to press pause on their computers—whenever the markets do something unexpected—cause market liquidity to crash. In turn, that magnifies the impact of each order.
- ⌚ Theoretically, it's possible that algo traders could cause a crisis in their own right. As the algorithms that determine buy and sell orders get more complicated, and as they come to include elements of machine learning, it's likely that different trading algorithms will interact with each other in highly unpredictable ways—possibly pushing prices to sky-high levels or pulling the floor out from under them. It's also possible that algos that aren't well supervised could get locked in a price spiral that flares out of control within seconds.

A flash crash took place in the US government bond market on October 15, 2014. The yield on the 10-year bond crashed and then rebounded.

- ⌚ Fortunately, the humans that babysit the computers have been quick to shut down trading—at least so far. But there’s no guarantee that they’ll always be vigilant or that they’ll always be able to keep up with the computers.

CRYPTOCURRENCIES AND INITIAL COIN OFFERINGS

- ⌚ Cryptocurrencies, such as Bitcoin, are online currencies that are largely independent of the traditional monetary infrastructure.
- ⌚ Traditional currencies are issued by central banks and reside primarily in the banking system. Banks also add to the money supply through their borrowing and lending activities, a process that economists call the money multiplier. Because of the banks’ role in creating traditional money, the vast majority of the supply of traditional currencies exists in electronic form—in bank file servers. But traditional money also exists in physical form, primarily cash, that circulates freely and anonymously.
- ⌚ Cryptocurrencies exist almost exclusively in electronic form. They’re issued by private companies and don’t need to be passed through banks at all. Instead, the ownership and circulation of these currencies are tracked by something known as a blockchain, which is an online distributed ledger system.
- ⌚ What a distributed ledger refers to is that the list of owners of a cryptocurrency—and a description of each owner’s holding—exists on a network of computers in which each computer maintains its own copy of the list.
- ⌚ Every time there’s a transaction in cryptocurrency, each computer taking part in the blockchain has to update its copy of who owns which units of the cryptocurrency. This feature helps maintain the security of the currency and enables it to exist outside the banking system.
- ⌚ Bitcoin is probably the most successful electronic currency to date, but it wasn’t the first. In the dotcom boom of the 1990s, there were many attempts to create online currencies, but they were basically flops. With names like Beenz and Flooz, a big part of the problem was simply taking these currencies seriously.

- ⌚ Other companies, such as PayPal, were more successful at moving us toward a digital currency. They did so by creating ways that people could pay each other over the internet without having to go through a bank. But PayPal and other systems are still dependent on the banking system and are simply more streamlined ways to utilize the existing payment system.
- ⌚ The creation of blockchain technology, and Bitcoin, in 2008—by the possibly fictional Satoshi Nakamoto—was a watershed moment because this cryptocurrency could operate securely and outside the established payment system built on the banks. It could also operate anonymously. Combined with other features, this made it the perfect currency to use on the so-called dark web, a part of the internet where illegal transactions in goods and services could flourish.
- ⌚ Eventually, the mainstream economy also recognized the potential value of a currency and payment system independent of banks. For one thing, the safety of the currency didn't depend on the health of the banks. And its value would be isolated from the decisions of the central bankers who controlled traditional currencies.
- ⌚ What really gave Bitcoin its utility was that distributed ledger technology: blockchain. Because a blockchain is a general type of computer application, it can be copied, modified, and customized by anyone with sufficient programming skills. Consequently, there's been an explosion in virtual currencies that utilize this technology.
- ⌚ Another currency-like innovation that has emerged in the past few years is the initial coin offering (ICO), which is similar to a cryptocurrency but exists only within a certain company. In the same way that you have to change dollar bills into game tokens at an arcade to be able to play the games there, ICOs create digital tokens that can be used to purchase the issuing company's products.

Each cryptocurrency that has appeared in recent years, such as Ethereum and Ripple, utilizes blockchain technology in different ways, and each has different rules governing its creation and usage.

Even central banks around the world are looking into using blockchain technology for traditional currencies.

⌚ To make things even more interesting, some of these products don't even exist yet. In other words, some ICOs are being used to fund start-up companies. Rather than floating shares of stock, they're issuing coins to be redeemed later for the company's products. The tokens created by the ICOs could become freely circulating cryptocurrencies in their own right, especially if the companies they fund prove to be big successes.



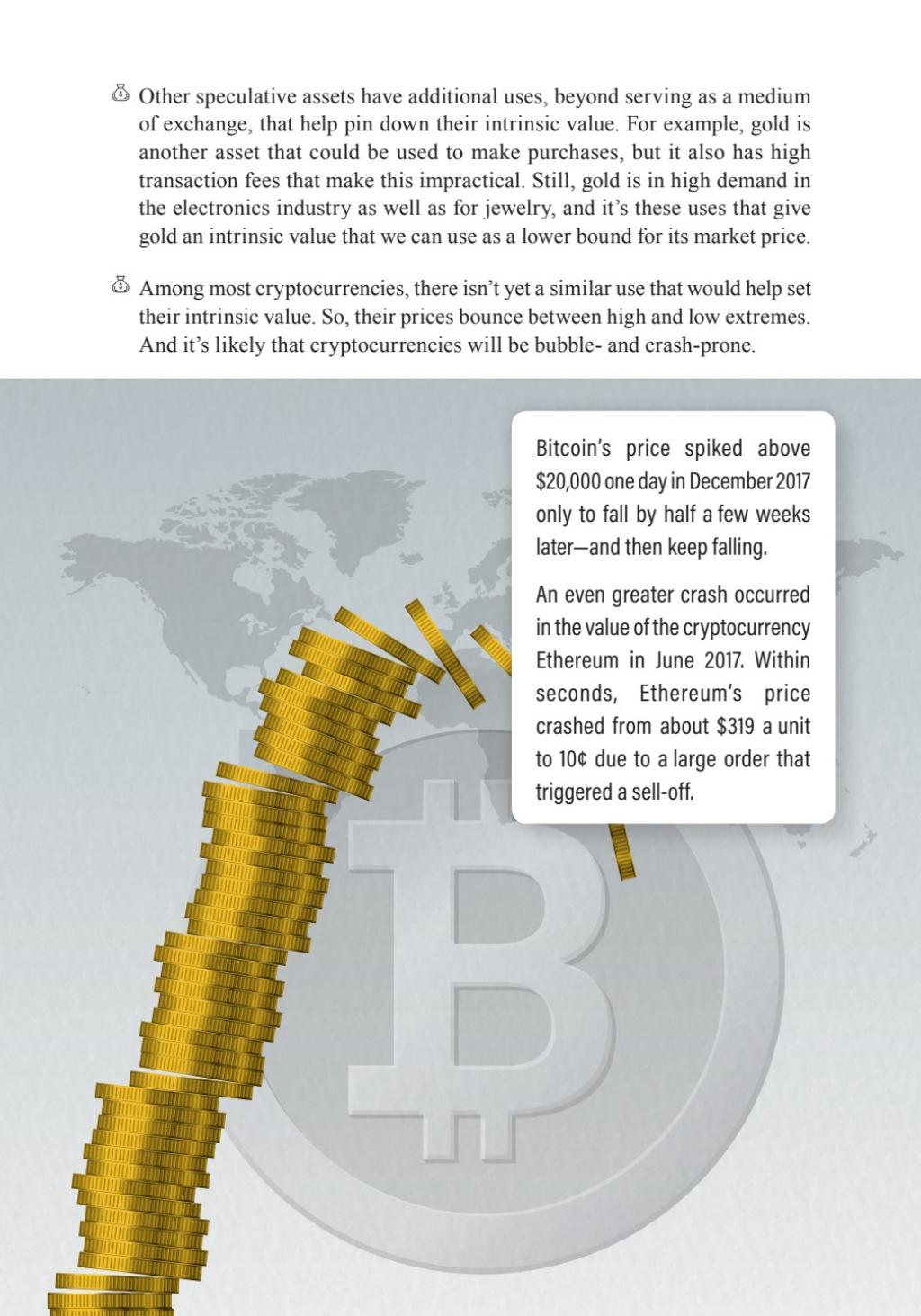
In Italy, the country's former telephone monopoly issued tokens that could be used in their pay phones. These tokens freely circulated and were treated just like regular money in the economy.

ELECTRONIC MONEY AND FUTURE FINANCIAL CRISES

- ⌚ Electronic money is most likely going to be a productive source of future financial crises. There are so many different things that can—and probably will—go wrong with them.
- ⌚ Let's start with the fact that these currencies exist only on computers and servers and that all computers can be hacked. All electronic forms of payment and currency are vulnerable, despite some claims of superior security. As cryptocurrencies grow larger and their underlying blockchains spread onto more and more computers, they may become more difficult to hack into and steal, but it's never going to be impossible.
- ⌚ The exchanges where cryptocurrencies are bought and sold have also proved to be quite vulnerable. Many of them have been hacked, including Mt. Gox—once the largest Bitcoin exchange—and Youbit, a South Korean exchange. Both declared bankruptcy as a result.
- ⌚ Again, the more cryptocurrencies increase in value, the more attractive targets the exchanges will be to armies of hackers. The security breaches that result could lead to financial disaster for thousands, or even millions, of individuals who invest their savings in cryptocurrencies.
- ⌚ ICOs are just as vulnerable. Not only have hackers stolen millions of dollars from individual ICOs, but many of the companies have turned out to be frauds.
- ⌚ Even if we set security issues aside, electronic currencies still portend major crisis potential. One potential problem arises from the fact that cryptocurrencies may be the prime vehicles for speculation. This is because it's difficult, if not impossible, to know what the correct value of a cryptocurrency is.
- ⌚ With Bitcoin, transaction fees that have spiked as high as \$20 or more made it impractical to spend on most transactions. Yet spending a currency—and adding up the prices of the goods and services it can buy—is one of the best ways to establish value. If people don't spend the new currencies, it will be very difficult to gauge their true worth, or intrinsic value.

In 2016, more than \$50 million in Ethereum was basically stolen by a programmer who had access to the code underlying it and exploited a weakness in the program.

- ⌚ Other speculative assets have additional uses, beyond serving as a medium of exchange, that help pin down their intrinsic value. For example, gold is another asset that could be used to make purchases, but it also has high transaction fees that make this impractical. Still, gold is in high demand in the electronics industry as well as for jewelry, and it's these uses that give gold an intrinsic value that we can use as a lower bound for its market price.
- ⌚ Among most cryptocurrencies, there isn't yet a similar use that would help set their intrinsic value. So, their prices bounce between high and low extremes. And it's likely that cryptocurrencies will be bubble- and crash-prone.



Bitcoin's price spiked above \$20,000 one day in December 2017 only to fall by half a few weeks later—and then keep falling.

An even greater crash occurred in the value of the cryptocurrency Ethereum in June 2017. Within seconds, Ethereum's price crashed from about \$319 a unit to 10¢ due to a large order that triggered a sell-off.

- ⌚ Today, we're experiencing something of a gold rush mentality for cryptocurrencies and blockchain technology that's strikingly similar to the dotcom boom and bust of the late 1990s.
- ⌚ For one thing, new cryptocurrencies and ICOs are appearing on almost a daily basis. Eventually, there's going to be a shakeout in this space, in which the weaker players will fold. And that's going to destroy the value of a lot of people's savings.
- ⌚ In the meantime, increased excitement—leading to overoptimism—about these products will inflate bubbles, making it difficult for people to resist the urge to invest. Some companies that simply changed their names to include the terms “blockchain” or “crypto” have seen their prices soar.
- ⌚ This is exactly the sort of market behavior that we saw in the final months of the dotcom boom, when everyone was scrambling to get a share of the billions of dollars flowing into the stocks of new-economy companies. In contemporary times, even if some cryptocurrencies crash, there's still one more big financial disaster waiting in the wings, as long as one or more of them survive.
- ⌚ Money has 3 distinct functions. The first 2 are medium of exchange and store of value. But it's the third function—the unit of account function—that has the potential to create the largest financial crisis. The phrase “unit of account” refers to the fact that we use money to keep a tally of our assets and liabilities, just as an accountant would. But this description hides its real power, which is to create debts, or to make loans.
- ⌚ If people accept cryptocurrencies as means of payment or stores of value—or both—then they'll almost certainly be willing to borrow, and lend, in these currencies as well. This means that the issuers of cryptocurrencies could start making cryptocurrency loans. All they'd have to do is create more units of the currency, which is virtually costless to do. They can lend as much as they want.
- ⌚ Lending is a key way that currencies expand and grow. And as loans expand the supply of credit, it pumps up aggregate demand and economic activity. As we've seen several times in history, the faster the amount of credit grows now, the more danger there is that the lending becomes reckless and sets the financial system up for a crisis later.

- ⌚ In the traditional banking system, central banks and regulators can question the rate of growth in lending and try to rein it in. But in a completely private and independent currency system, the only restriction will be the self-restraint of the lenders. While credit is expanding, the lenders will rake in the profits. And they won't be interested in ending the party.
- ⌚ What this means is that cryptocurrencies could lead to exactly the same kind of credit boom-and-bust cycle that we've seen many times in history. Because cryptocurrencies have originated outside of the government regulatory umbrellas, at least traditionally, and some may succeed at remaining there, the credit booms and busts in the future could be even bigger than those of the past. And that is a truly scary prospect.
- ⌚ Innovation doesn't cause trouble on its own, of course. Instead, cryptocurrencies—and other technologically driven products—provide new ways for people to engage in behaviors that have always caused financial disasters: stealing, speculating, and excessive borrowing.

SUGGESTED READING:

Lewis, *Flash Boys*.

US Securities and Exchange Commission, "Investor Alert."

QUESTIONS TO CONSIDER:

1. Do you agree that Bitcoin and other cryptocurrencies are “perfect” speculative assets? If so, what makes them ripe for speculation? Will speculation in these assets add to their allure, or will it be their ultimate undoing? Or will the world learn not to speculate in cryptocurrencies?
2. Central banks around the world are experimenting with cryptocurrencies and may introduce “crypto” versions of the euro or US dollar. Will central-bank-based cryptocurrencies be less susceptible to financial crises than private cryptocurrencies? Why or why not?

THE CON MEN

CHARLES PONZI

AND IVAR KREUGER

LECTURE 2

Ponzi schemes—named after its most famous practitioner—have tremendous power to draw in large numbers of people, even when the victims probably should know better. This lecture examines a few of the most significant Ponzi frauds of the past century. The first con was based in part on US postage stamps and was the creation of Charles Ponzi, an Italian-born swindler who promised profits of 50% within 45 days. The second story introduces the charismatic Swedish-born king of matchsticks, Ivar Kreuger.

Ponzi schemes tend to have 3 ingredients that make them almost irresistible.

The person in charge is either very charismatic or intelligent—and often both. Our admiration for the person gives credibility to the investment plan and makes us believe that the person is honest.

The principles of the investment are publicly disclosed. This amplifies our perceptions of credibility and honesty. And other people do seem to have made lots of money by investing with this person. This “proof” pushes several of our psychological buttons at once and is a powerful inducement to open up our own wallets and take the plunge. Unfortunately, it’s mostly a show.

These schemes promise too much to too many people. In other words, even if they’re based on reputable investments, they eventually spread the winnings too thin, run out of money, and collapse.

CHARLES PONZI

- ⌚ In 1906, an international postal treaty had created international reply coupons, which were vouchers that could be traded for stamps in any country that signed the treaty. The purpose of the coupons was to make it convenient for people to prepay international return postage without having to exchange currencies in small amounts—which was completely impractical.
- ⌚ Of course, the people who designed the system realized that the coupons needed to have the same value everywhere they circulated. To achieve this purpose, they imposed a fixed exchange rate on the coupons.
- ⌚ At the time when the coupons were first issued, much of the world had operated on a classic gold standard that supported fixed exchanges for international currencies and the postal coupons alike. But World War I broke the gold standard. And the currency values of many countries plunged, while the prices of the international reply coupons didn’t change.

⌚ So, by 1919, it was possible to spend a few cents on international reply coupons in Spain and Italy, for example, that could be exchanged for a dollar's worth of US postage stamps. This was potentially a huge arbitrage opportunity. Of course, you'd have to travel to Spain or Italy to buy large quantities of international reply coupons and then transport them back to the US, where you'd have to exchange the coupons for stamps and somehow exchange all those postage stamps for cash.



⌚ But worrying about such practicalities didn't stop Charles Ponzi, one of the most spectacular frauds in history, who decided to harness his charisma to get into the business of investing. He didn't even ask the US Postal Service whether it was possible to exchange international reply coupons for cash until several months after he'd launched his company, the Securities Exchange Company.

⌚ This inquiry, by the way, triggered a series of investigations that turned up nothing because Ponzi wasn't actually transacting in international reply coupons—or stamps. Still, Ponzi insisted to investors that somehow he was able to work this arbitrage and provide a 50% return within 90 days on money invested in his company.

⌚ This is the second ingredient of a Ponzi scheme: He was offering a too-good-to-be-true return, but he was open about how he delivered it. He used word of mouth to attract his first customers and then recruited many of them to become commission-based salespeople.

- ⌚ Ponzi took people's money and gave them certificates they could redeem in 90 days. In reality, he told investors he'd make good on his promise in 45 days. And as the end of January 1920 came, he did.
- ⌚ That was the clincher, the third ingredient of the scheme. After Ponzi made good on those first notes, the business took off. In March 1920, his Securities Exchange Company took in \$30,000. In April, the inflow rose to \$140,000, and the company started to open branches throughout New England to satisfy public demand for the investment opportunity. In May, \$440,000 came in, and, in June, a staggering \$2.5 million came in. That was easily surpassed in July by another \$6.5 million invested.
- ⌚ What did Ponzi do with all that cash? He bought an estate in prestigious Lexington, Massachusetts, with Persian rugs and hand-carved mahogany furniture from Italy as well as a new Hudson for his daily commute into Boston.
- ⌚ Mostly, Ponzi deposited the money into banks and invested in other assets, especially bank shares. But he certainly didn't invest in anything that could come close to the 50% return in 90 days that he continued to promise his investors.
- ⌚ Notice, though, that the amount of money invested was growing at a much higher rate than the promised 50% returns. So, it wasn't a big problem for Ponzi to redeem maturing notes during this time. This is one of the defining features of a Ponzi scheme, as well as its main weakness: As soon as the growth rate of new investments falls below the paid rate of return, the scheme runs out of cash.
- ⌚ The growth rate can fall for many reasons, one of which might be a lack of new investors. But many Ponzi schemes also start to attract unflattering attention from skeptical investors, the media, or regulators. And if their doubts don't receive satisfactory answers, then public opinion can quickly turn against the scheme and start a run that triggers its collapse.
- ⌚ That's fundamentally what happened to Ponzi's Securities Exchange Company. The process took longer than you might expect, however. The Massachusetts state banking commission began investigating, along with the US attorney's office and the Suffolk County DA, and *The Boston Post* published a series of skeptical editorials and investigative reports.

- ⌚ By the end of July 1920, Ponzi knew he had to do something to get the regulators and media off his back. So, he offered to let government attorneys audit the books of his firm. He also stopped accepting investments while the audit took place. This sent a huge negative signal to investors, who started a run on the company. But at that point, Ponzi had enough cash on hand to pay off redeeming notes or repay the principal on early redemptions. These repayments stemmed the run.
- ⌚ *The Boston Post* kept hammering away and set off a fresh run the following week by printing a story, based on information from a former employee, that Ponzi was “hopelessly insolvent.” Once again, the company stemmed the run. But doing so drained its cash to a critically low level. And by this time, the regulators were also closing in.
- ⌚ The last straw was an article in *The Boston Post* on August 11, 1920, that uncovered Ponzi’s criminal conviction for forgery in Canada years earlier. Ponzi knew that this would destroy public confidence in him, so he turned himself in to law enforcement authorities on August 12, 1920.
- ⌚ Investors who held promissory notes from the Securities Exchange Company didn’t lose everything. They eventually recovered a little more than a third of what they’d invested. It took more than a decade, though. Ponzi himself spent most of the next decade in federal and state prisons, before being deported to Italy. He died on January 18, 1949.

IVAR KREUGER

- ⌚ Only a few years after Charles Ponzi’s scheme unraveled, another one involving Ivar Kreuger—the Match King—was just gathering steam.
- ⌚ Kreuger cofounded a successful engineering firm called Kreuger & Toll, based in London, and his family owned a small match-manufacturing company in his native Sweden, which he expanded through an aggressive acquisition campaign.

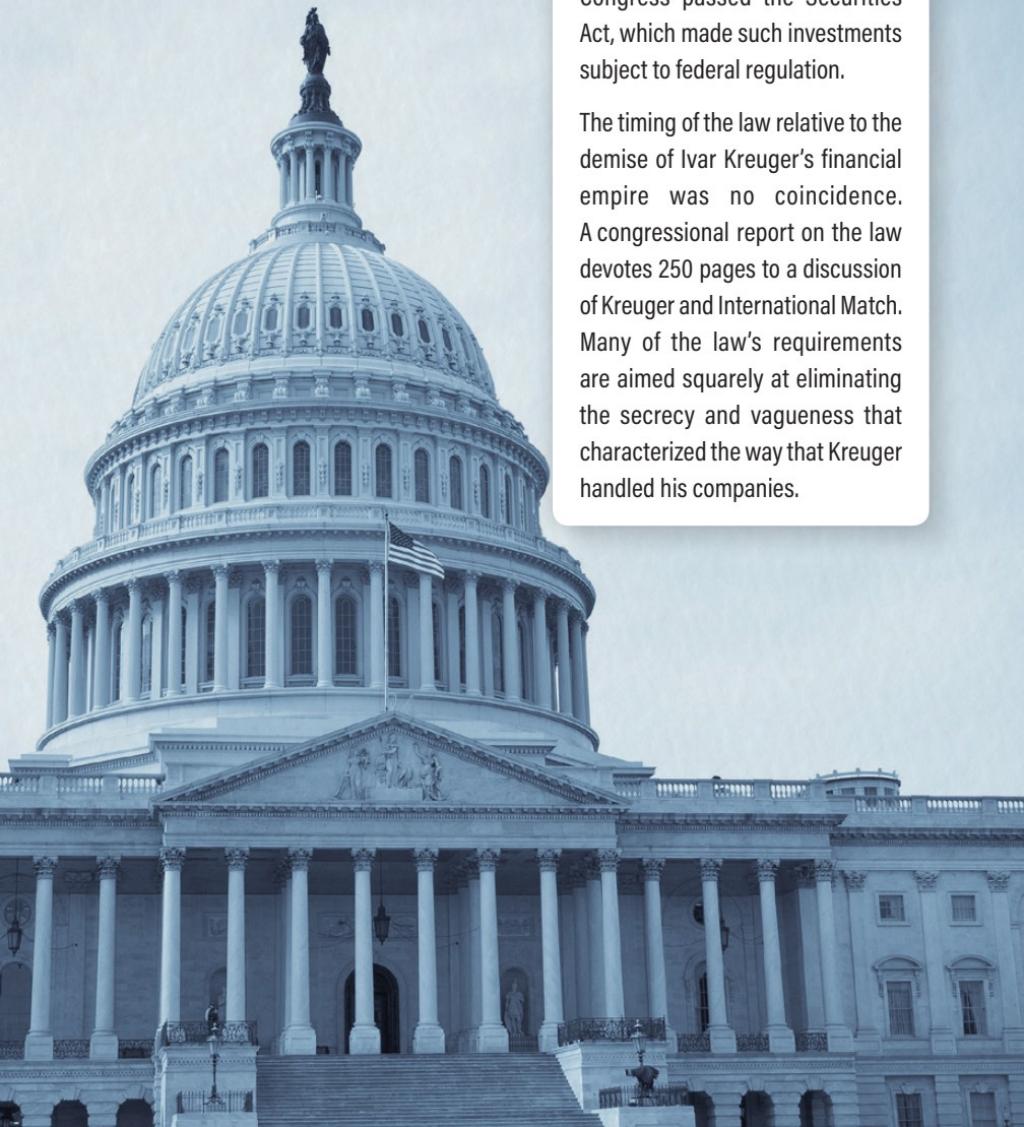


At the time, every person needed to use several, if not dozens, of matches each day, and by the middle of World War I, Kreuger had a virtual monopoly over matches in Sweden.

- ⑤ Kreuger's charisma and intelligence gave him immense credibility with American bankers. That's an important first ingredient of a Ponzi scheme. Second, he presented an aggressive yet plausible investment plan that promised big returns.
- ⑤ Kreuger proposed to lend millions of dollars to cash-strapped governments around the world—especially in Europe—in exchange for monopolies over their match industries. He also created a special company, called International Match, to collect the interest payments on loans made to foreign governments and to earn monopoly profits from the sale of matches in those countries.
- ⑤ Finally, there was the clincher: Kreuger pointed out that his current businesses were so profitable that they paid incredibly high dividends. Kreuger & Toll shares paid a dividend equal to 25% of their par value, which was unheard of, and Swedish Match paid dividends of more than 10%.
- ⑤ In 1923, American bankers and investors bought \$14 million of bonds issued by the newly created International Match. A year later, International Match issued \$15 million dollars' worth of preferred stock—a slightly less secure form of debt, but safer than standard equity securities—and used this money to retire the bonds by buying them back from investors. The goodwill created by this maneuver helped International Match successfully issue another \$19 million worth of preferred shares within the following year.
- ⑤ Kreuger's company used the proceeds from these stock issuances to make its first big international loan, to Poland, in exchange for a monopoly over the country's match business. Over the next few years, similar deals followed.
- ⑤ By late 1927, International Match had match monopolies in a dozen countries, and it had pulled off the largest deal yet. Now, the company issued bonds in the United States to raise another \$50 million, to make a \$75 million loan to the French government. This was significant because for years, the main lender to the French government had been J. P. Morgan & Co. The deal marked the arrival of Ivar Kreuger, and International Match, to the top of the pile of elite global bankers.

- ⌚ Behind the scenes, however, Kreuger's financial empire was in a state of constant chaos. He set up multiple shell companies in traditional tax haven countries and constantly shuffled money among these companies. As money came in, Kreuger diverted funds to whatever company needed them. For one thing, he had borrowed heavily to create Swedish Match, and it wasn't clear that the company's profits were sufficient to pay these debts back.
- ⌚ In addition, both Swedish Match and Kreuger & Toll had promised incredibly rich dividends to their shareholders, and it wasn't clear that the businesses generated sufficient profits to pay the dividends. On top of this, International Match ended up lending money at surprisingly low interest rates to win the match monopolies.
- ⌚ And Kreuger was still investing in new factories for the match companies he owned, as well as in unrelated businesses. Kreuger kept forging ahead with new deals and new investments, seemingly without much regard for whether the profits from these investments would justify the outlays.
- ⌚ New money coming in was being used to make payments on old obligations. It's this diversion of funds among Kreuger's various companies that gives the case its character as a Ponzi scheme.
- ⌚ Kreuger was able to keep this house of cards from collapsing by keeping virtually all of it hidden from investors, including the American investment bank that he worked with: Lee, Higginson & Co. He released just enough information—at just the right times—to keep his investors from getting cold feet.
- ⌚ But eventually, Kreuger pushed things too far. The beginning of the end was a deal to lend the German government \$125 million in exchange for a match monopoly in Germany. As usual, he made the deal without having the cash in hand. So, he issued securities and diverted profits from his other businesses to come up with the money he'd promised to lend.

Most of the companies listed on the New York Stock Exchange during the 1920s didn't issue quarterly financial reports, and a third of them didn't issue any financial reports at all. And the reports that were issued lacked detail; many of them could fit on a postcard.



The collapse of International Match had a big impact on US securities law. Until then, rules governing the issuance of stocks and bonds were mostly made at the level of individual states. But in 1933, Congress passed the Securities Act, which made such investments subject to federal regulation.

The timing of the law relative to the demise of Ivar Kreuger's financial empire was no coincidence. A congressional report on the law devotes 250 pages to a discussion of Kreuger and International Match. Many of the law's requirements are aimed squarely at eliminating the secrecy and vagueness that characterized the way that Kreuger handled his companies.

- ⌚ To make things worse, he arranged this loan in October 1929, just as stock markets in Europe and the United States were starting to decline. Therefore, Kreuger wasn't able to raise as much new money from American investors as he'd hoped. So, finding the cash to lend to Germany put a tremendous strain on his empire.
- ⌚ He was saved only by a surprise decision on the part of the French government to repay its loan early. Most of the French repayment got funneled immediately to Germany—through Kreuger's shell companies, of course.
- ⌚ The next 2 years were a constant scramble for Kreuger to fund all of his obligations. By 1931, he was borrowing from any willing bank lender, including the central bank of Sweden, and by 1932, he had virtually exhausted any lines of credit he could obtain.
- ⌚ In March 1932, Kreuger was in Paris preparing for a difficult meeting with the Swedish and French banks that had loaned him millions over the years. The night before the meeting—which was to take place on March 12, 1932—Kreuger's main Swedish banker told him that his Swedish lenders were unwilling to advance any more funds and that they needed him to present a plan for repayment. In addition, the banker informed Kreuger that the Swedish government had obtained warrants to search through all of Swedish Match's financial records.



- ⌚ The next day, Kreuger failed to show up. His body was later discovered in his Paris apartment. He'd apparently committed suicide with a pistol he'd purchased the night before, though this story has been disputed.
- ⌚ When news of Kreuger's death reached the United States, the values of all securities associated with International Match plummeted in value to pennies on the dollar. International Match's collapse also brought down Lee, Higginson & Co.
- ⌚ As with Charles Ponzi's scheme, International Match wasn't actually worthless. It still owned profitable match factories and loans to governments. Over the next 13 years, the holders of securities in the company recovered nearly a third of what they'd invested, assuming they'd purchased securities at their initial offering prices.

SUGGESTED READING:

Partnay, *The Match King*.

Zukoff, *Ponzi's Scheme*.

QUESTIONS TO CONSIDER:

1. Some people criticize Social Security for being a Ponzi scheme. What aspects of Social Security are similar to Ponzi schemes? Do you agree with this criticism?
2. After the fall of the Soviet Union, many former communist countries were swept by huge pyramid and Ponzi schemes. For example, this article—<http://www.imf.org/external/pubs/ft/fandd/2000/03/jarvis.htm>—describes one that took place in Albania. What aspects of society made these countries especially susceptible to these scams? What lessons do you think these countries hold for others?

A BOOM IN BUSTS

LECTURE 3

There is tension in our views of the financial markets between today's modern, unstable financial markets and the more docile, predictable financial markets of the past. Perhaps surprisingly, the unpredictable—and sometimes chaotic—nature of contemporary financial markets seems to be a norm that has prevailed throughout much of history, while the outlier, in historical terms, is the days of financial stability and predictability that existed not long ago.

FINANCIAL STABILITY AND INNOVATION

- ⌚ The US financial system that many of us today associate with stability and prosperity was built during the depths of the Great Depression. Landmark legislation—including the Banking Act of 1933 and the Securities Act of 1933—remade America’s battered financial system and erected the beginnings of a social safety net.
- ⌚ These laws imposed strong separation between commercial banking and investment banking and introduced federal deposit insurance to protect customer deposits. In addition, the newly created Securities Exchange Commission (SEC) required public corporations to register their securities with the government and formalized public disclosures by the company while also extending federal regulation and supervision to the bond and stock markets for the first time.
- ⌚ The reason why Congress and the president deemed all of these new laws and federal agencies necessary was the huge financial crisis—the Great Depression—that swept across the US, and around the world, during the early 1930s.
- ⌚ The scale of this financial disruption was huge, mostly because of widespread bank failures. That caused massive contraction of aggregate economic demand and a recession of unprecedented scope and intensity. To this day, the Great Depression is unmatched, in terms of the decline in gross domestic product and the dislocations associated with the era’s high unemployment.
- ⌚ The shock was so profound that the federal government contemplated abandoning its largely laissez-faire approach to the financial markets. Instead, a new bargain was struck between society—in the form of its representatives in Washington—and the financial services industry, centered in New York.
- ⌚ On one hand, banks and the rest of the financial services industry would now face numerous strict limits on what they could do. The industry did get something valuable in return, though: protection from competition. Commercial banks were restricted in terms of the number of branches they could establish, and interstate banking was generally not allowed.



- ⌚ These rules meant that outside of the big cities, American banking consisted mostly of local monopolies. On top of that, ceilings were imposed on the interest rates that banks could pay on customer deposits, which kept their funding costs low. In the stock market, brokers were allowed to charge their customers high, fixed commissions that were the same across the industry. All of this kept profits healthy.
- ⌚ At the same time, 2 big developments on the macroeconomic side helped to steady the financial markets. Both had to do with World War II. To finance the war, the government had to borrow billions of dollars by issuing bonds. The Department of the Treasury was now allowed to set interest rates artificially low, holding down its financing costs.
- ⌚ Because the rates on government bonds signal the lower bound for private lending rates, this created an environment of low and stable interest rates for the rest of the economy. The arrangement lasted until March of 1951.

- ⌚ The postwar international monetary system was also taking shape, and in a way that promoted low and stable interest rates for the United States. Just before the end of the war, the Bretton Woods system—named after a United Nations-sponsored conference at a resort in New Hampshire—produced an agreement on a new framework of fixed exchange rates among all participants.
- ⌚ Under this system, the United States would peg the dollar to gold, at a value of \$35 per ounce. Every other country participating would then peg their currencies to the dollar. The effect of this was to create huge global demand for dollars—the new standard of international convertibility—thereby soaking up any excess supply of dollars created by expansionary monetary and fiscal policy in the United States.
- ⌚ This is important, because an excess supply of dollars inside the United States would have stoked domestic inflation and pushed up US interest rates. Instead, as Europe rebuilt—and the world adjusted to the dollar as the new reserve currency—the international demand for dollars mopped up the extra money supply. This supported low and stable domestic interest rates in the United States well into the 1960s.
- ⌚ So, times were generally good for the US financial services industry, particularly among commercial banks. They accounted for the vast majority of credit in the country and tended to be profitable.
- ⌚ The days of highly restricted—and highly profitable—financial services lasted into the 1960s. And then the institutions' profitability began to decline. That's because interest rates were on the rise. Europe had finished rebuilding from the war, and most countries had accumulated all the US dollar reserves they wanted. Yet the United States—driven by government spending on the Vietnam War and social programs of the Great Society, such as Medicare—kept increasing the global supply of dollars.
- ⌚ This led to higher inflation inside the United States and higher domestic interest rates, too. And the relentless pressure of higher inflation—and those higher interest rates—unraveled the compromise of the 1930s. With interest rates now rising, and deposit rate ceilings left in place, frustrated savers began to pull their deposits out of banks to search for higher-yielding investments, such as treasury bills, commercial paper, and bankers' acceptances, which were used to fund international trade.

- ⌚ Lenders and other financial institutions reacted to the threat by creating new products that either exploited loopholes in existing rules or skirted them altogether. Banks created large-value, negotiable certificates of deposit, called jumbo CDs, with a face value of \$100,000 or more. These exceeded federal deposit insurance protections but offered market interest rates. And investment companies invented money market mutual funds, which worked like bank deposits but paid market interest rates even on small deposits.
- ⌚ Once financial companies started innovating their way around the older regulations, there was no turning back. New products and services could be invented faster than the regulators could keep up. And institutions that chose to play by the rules conservatively found themselves losing profits, market share, and eventually money. By 1980, the entire savings and loan industry was technically bankrupt, roughly a full decade before the height of the savings and loan crisis. So, already the situation was unsustainable.
- ⌚ At the same time, a big change was taking place in people's attitudes in favor of freer markets and away from strict regulation. US economic performance was surprisingly bad during the 1970s, with higher inflation and lower growth than in the previous 2 decades.
- ⌚ Economists came up with concepts like rational expectations and supply-side economics and used them to argue that well-intended government intervention in the economy was increasing inflation and reducing economic growth.

FINANCIAL DEREGULATION

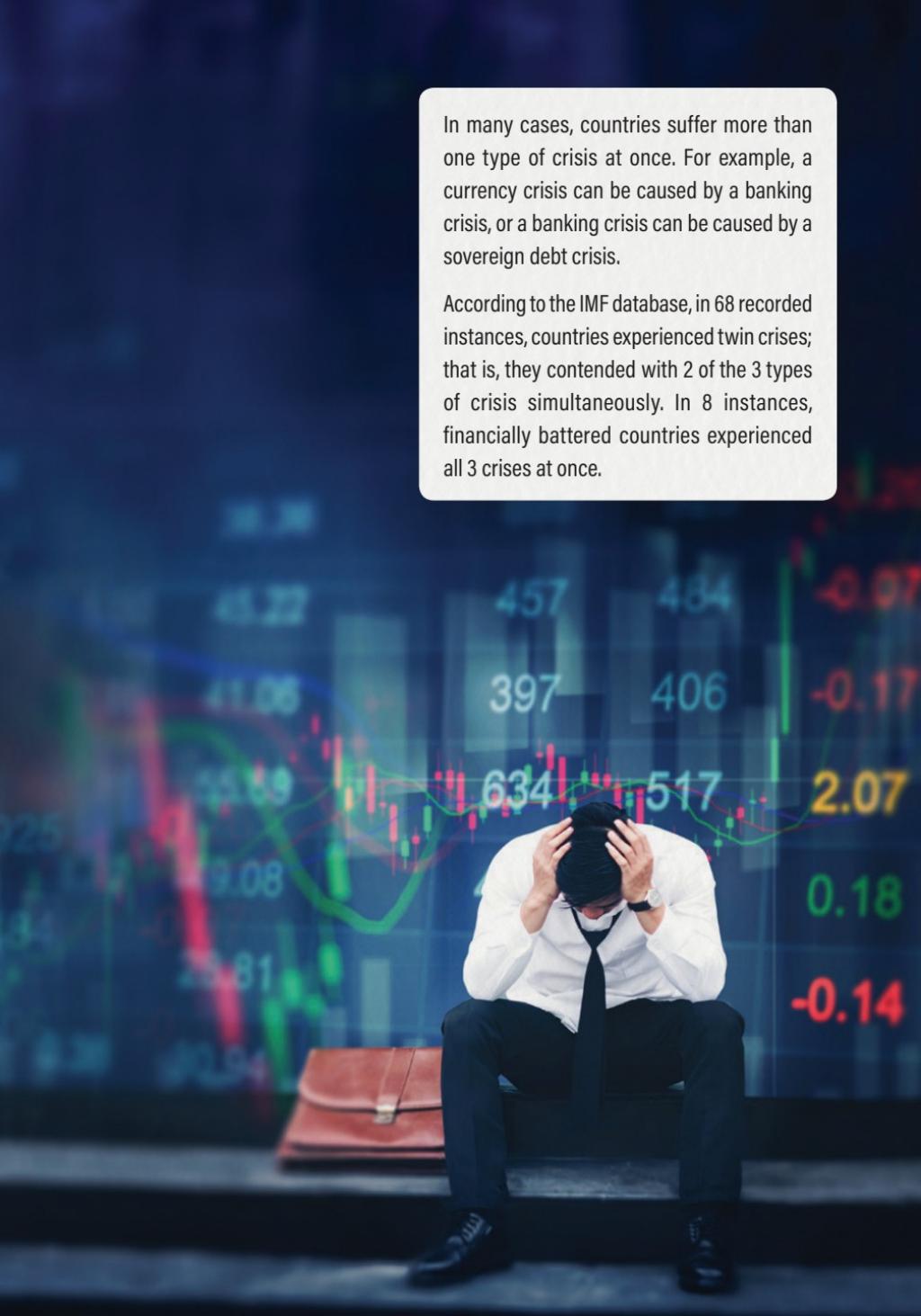
- ⌚ All of these factors contributed to a massive shift in regulatory and legislative sentiment in favor of deregulation, starting in the early 1980s. At first, these measures were fairly small and limited, but the trend gathered momentum as financial executives found they not only liked the new freedoms, but also felt they needed greater freedoms to protect their profits.
- ⌚ That's because deregulation exposed banks and other financial institutions to increased competition from new products and players. And one of the main ways they dealt with the increased competition was to create their own new products and services they could charge premium prices for.

- ⌚ Financial deregulation, or financial liberalization, had its own characteristic trade-offs. On one hand, deregulation began the process of democratizing the financial markets. This meant that people who traditionally had been shut out of the financial markets now gained access.
- ⌚ This is one of the main benefits of financial deregulation, because it's incredibly difficult for most people to improve their lives without access to credit. Think about buying a home, starting a business, or educating your children. Financial deregulation has opened up opportunities for hundreds of millions of people around the world to invest in themselves in these ways, thanks to their increased access to loans of various kinds, from microloans to the credit cards that finance some high-tech start-ups.
- ⌚ The downside of financial deregulation stems from the fact that it enables people to take on more risk. When their access to credit grows, some people and companies will take on much larger risks, and some of those risks won't pay off.
- ⌚ In other words, deregulation leads to greater risk taking, which leads to increased losses and decreased financial stability. As evidence of this, the historical record—for the United States and internationally—documents a clear difference in the behavior of postderegulation financial markets.



FINANCIAL CRISES

- ⌚ By the mid-1990s, international economists were noticing a significant increase in the number of countries that had experienced some kind of financial problem since 1980. The World Bank economist Gerard Caprio coined the term “boom in busts”—and it stuck.
- ⌚ Many economists have measured and counted the busts, but a pair of International Monetary Fund (IMF) economists, Luc Laeven and Fabian Valencia, put together what is considered the leading database on international financial crises. It goes back to the 1970s, covers all countries on earth, and tracks 3 separate types of financial crises: banking crises, currency crises, and sovereign debt crises.
 1. To qualify as having a banking crisis, a country has to have demonstrated significant signs of distress in its banking system, including bank runs, failures, and other large losses. In addition, there must be significant government intervention in the banking system, such as bailouts of various kinds or emergency measures, such as a freeze on bank withdrawals or bank holidays. In total, 147 banking crises occurred between 1970 and 2012, and many countries experienced more than one banking crisis.
 2. A currency crisis occurs when the holders of a country’s money lose confidence in its value and try to get rid of it. There are many reasons why the markets might lose confidence in a nation’s currency, including big trade deficits or other financial problems. To qualify as a crisis, the value of a country’s currency must depreciate—that is, fall in value—against the US dollar by at least 30% within 1 year, and the rate of depreciation must be at least 10 percentage points higher than the previous year. About 218 currency crises were recorded between 1970 and 2011.
 3. Because “sovereign debt” is another term for government borrowings, a sovereign debt crisis describes a government default, or near-default. Such crises are fundamentally caused by overborrowing, which in turn is related to a government spending too much for too long. Eventually, the holders of the government’s debt lose confidence that the sovereign will repay, or the government itself announces that it won’t make payments on time. Either event can trigger a sovereign debt crisis. To be counted as a sovereign debt crisis, a government must have defaulted or postponed payments on debt held by private investors. Between 1970 and 2012, there were at least 67 sovereign debt crises.



In many cases, countries suffer more than one type of crisis at once. For example, a currency crisis can be caused by a banking crisis, or a banking crisis can be caused by a sovereign debt crisis.

According to the IMF database, in 68 recorded instances, countries experienced twin crises; that is, they contended with 2 of the 3 types of crisis simultaneously. In 8 instances, financially battered countries experienced all 3 crises at once.

FINANCIAL RISK

- ⌚ Most people know that to succeed in business, you have to take risks. The financial services industry is no different. If anything, the pressure to take risks—and push limits—is even stronger in banking and financial services than in the rest of the economy. The reason is that financial products can't be protected from competition by patents or trade secrets. And they're extremely easy to copy.
- ⌚ This implies that whenever someone comes up with something innovative and profitable in the financial markets, it's copied extremely quickly by others, and the excess profits get squeezed out much faster than in other businesses or markets.
- ⌚ So, the need to innovate is more acute in financial services—to stay ahead of the herd and keep the profits coming. And innovating means taking on risks, some of which will pay off handsomely, along with some that will blow big holes in your balance sheet and others' balance sheets.
- ⌚ Even if we wanted to turn the clock back and return to a highly regulated financial system, we really can't do that. Financial services run on information. When it was easier to control, or limit, access to information, regulators could limit—or prohibit—financial activities they didn't like. Only certain institutions, such as banks, had the information they needed to perform activities like lending or trading.
- ⌚ And the models they used to make their decisions were relatively simple. Therefore, it was fairly easy for regulators to monitor what was going on and enforce their wishes on these financial institutions.
- ⌚ But as information technology improved, the ability to offer financial services has moved out of traditional financial institutions and into the hands of almost anyone. Think of the explosion in peer-to-peer lending; individuals can go to online lending platforms and review information about borrowers themselves. Algorithms built into the platforms help lenders screen the people who are asking for loans.
- ⌚ As this example suggests, if regulators try to crack down on a certain type of financial service—but society wants it—then all the regulators

succeed in doing is driving it out of the traditional financial service providers and into places where the regulators don't have jurisdiction.

- ⌚ This is just one reason why we can't return to the days of a highly restricted financial market. But this also implies that failures, bubbles, crashes, and panics are a normal state of financial markets and will occasionally take place.
- ⌚ In a thriving financial market, people take risks. And risks don't always pay off. So, we should aim for a resilient financial system that is able to absorb those losses and failures that are a necessary consequence of risk taking without causing financial chaos or deep recessions.

SUGGESTED READING:

Laeven and Valencia, "Systemic Banking Crises Database."

Reinhart and Rogoff. *This Time Is Different*.

QUESTIONS TO CONSIDER:

1. One proposal to bring back the good old days of financial stability is to introduce something called narrow banking. Look up narrow banking on the internet (there are plenty of sources) and read a little bit about what it is and what its supporters claim. Would you be in favor of narrow banking? What would we give up if we required all banking to be done this way?
2. Which countries today seem to be most in danger of experiencing one or more of the 3 crises explained in this lecture (banking crises, currency crises, and sovereign debt crises)? If you had to guess which country will have the next bust, which country would you choose and what kind of a financial crisis do you think it will experience?

THE TULIP BUBBLE

LECTURE 4

The Dutch tulip bubble, which took place in late 1636, doesn't have much in common with other financial bubbles in history, and evidence suggests that it wasn't as extreme as often portrayed. The prices of some tulips did rise spectacularly, but not the prices of all tulips, and not the ones you might expect. Speculative frenzies like the tulip bubble are referred to by economists as asset price bubbles.

ASSET PRICE BUBBLES

- ⌚ There isn't a universally accepted, precise definition for asset price bubbles, but for the purposes of this course, an asset bubble is the upward departure of an asset's price from a reasonable level, increasing over time. This definition reflects the most important part of financial bubbles, which is we suspect that the current market price is incorrect. Usually, it's much too high—relative to a “reasonable price.”
- ⌚ The part that makes defining a bubble so difficult is figuring out what that reasonable price is. Financial economists sometimes use models to make that determination, but there are many different models to choose from, and it's not always clear that any particular model is the best one. That's why we can't define bubbles precisely.
- ⌚ Incidentally, if we can't define bubbles precisely, we can't identify them precisely. This means that we can't use statistical methods to identify bubbles in the data—at least not reliably.
- ⌚ So, we have to fall back on fairly informal and imprecise methods. For example, if you pay attention to gold, art, or real estate and watch its price fluctuate over time, you can probably get an idea of what a “reasonable price” for this asset is. We tend to naturally use our experience and rules of thumb to set reasonable prices whenever we have to deal with prices on a repeated basis.



- ⌚ Given that we have to rely on informal ways to estimate a reasonable price for a given asset, this means that identifying bubbles becomes a matter of opinion. But the higher the price of an asset, the more people will probably believe there's a bubble in it.
- ⌚ We can think of the current price of any asset as consisting of 2 parts: the reasonable or fundamental value and the bubble part. Most of the time, the bubble part is equal to zero. But under certain circumstances, the bubble part may start to grow. Oddly, the growth in the bubble part of the price is what keeps the bubble alive.
- ⌚ People are tempted to buy an overpriced asset, irrespective of its fundamental value, if they think the price will keep going up and they can sell it later at a nice profit. And if the price rises fast enough, it will overcome enough people's hesitation so that they also buy and drive up the price even more.
- ⌚ A bubble is like a self-fulfilling prophecy: As long as it grows, people will keep buying the asset, and the bubble will grow further, attracting more buyers. But as soon as the price bubble stops moving, it dies—or, rather, pops.
- ⌚ If you've bought an asset while suspecting that the price is too high and are hoping to sell later at a higher price, then you need to sell out as soon as the price stops growing.
- ⌚ This is why people sometimes call this the greater fool theory: You might be foolish to buy an asset with a bubble in its price, but as long as there are greater fools out there who are willing to pay an even higher price for the asset, then you should be fine.
- ⌚ Even if you know that a bubble can't last forever (and it can't), it might still be worth it to buy an asset with a bubble in its price as long as you expect that bubble to keep growing in the short run.
- ⌚ We don't know for sure how bubbles get started, and some economists theorize that bubbles form randomly. One theory is that bubbles tend to form when there's a change in the market, or the economy, that raises the reasonable value of the asset by a significant amount.

- ⌚ For example, in the case of the tulip bubble, a fashion trend started in which women's gowns were adorned with fresh flowers, especially exotic ones like tulips. This change in preferences increased the demand for tulips and made the market price of the tulips rise. This is what should happen when preferences increase demand.
- ⌚ There is no obvious answer to how much the value of tulips should rise as a result, and this uncertainty leaves room for a bubble to creep into the price. In practice, the price of tulips might jump by a large amount. And some people will accept the price increase because they know that there's been a change in fashion and think maybe the demand really did rise by a large amount.
- ⌚ This creates excitement about continued price increases, which draws people into the tulip market who are more interested in speculating on future price increases than in actually owning any tulips. And the bubble starts to grow.
- ⌚ If this general story is correct, it means that bubbles get started accidentally, as a side effect of some change to the market that really has increased the reasonable value of an asset. It also means that bubbles are built on uncertainty.
- ⌚ If everyone knew exactly how much a change in preferences for tulips should affect their market price, there wouldn't be room for a bubble to form. Nobody would be willing to buy or sell tulips for a price other than the new correct value.
- ⌚ The accidental origin of bubbles is why many economists claim that bubbles arise randomly. We can't predict whether any particular piece of good news will cause any particular asset's price to take off. However, the more uncertainty there is about how a particular change might affect the value of an asset, the more likely it is that a bubble will creep into the price.
- ⌚ Just as bubbles may begin accidentally or randomly, they also seem to end that way. We know a bubble can't last forever, because it would drive an asset's price up to absurd levels. Even so, predicting when a bubble will run out of willing investors and stop growing seems to be pretty close to impossible.

- ⌚ Once the end of the bubble comes, though, it's usually pretty dramatic. A large fraction of people holding the asset will try to sell their investments at the same time, leading to a dramatic price collapse, or crash.
- ⌚ If we apply this description of bubbles to the example of the tulip bubble, then what we're looking for is evidence of a change in the market that implied a higher future value for tulips. This would be followed by an extremely rapid increase in prices and an eventual collapse.
- ⌚ Tulips had already been very popular across Europe in the 16th and early 17th centuries, and they became even more popular when flowers became interconnected with fashion. This combination might be what helped start the bubble.

THE TULIP BUBBLE

- ⌚ In the mid-16th century, when tulips were introduced to Europe, most tulip bulbs produced a flower of a single color, such as red or yellow. But some tulip bulbs produced multicolored flowers with beautiful patterns.

Tulips are large, colorful perennial flowers that were first introduced to Europe by the Ottoman Turks in the mid-16th century. Within a few decades, all the rich and powerful families in Europe were growing tulips in their gardens.

These bulbs were often smaller and grew slower than standard tulips, and they became known as broken bulbs. The flowers from broken bulbs were beautiful, and extremely rare. So, they became the focus of the European elite.

- ⌚ Europeans knew that the broken bulbs would pass on their special characteristics through the little buttons, or outgrowths, that formed from the main bulb. Tulips can also propagate through seeds, but the seeds wouldn't pass on these special characteristics. Thus, one important feature about the tulip bubble is that the market was for the tulip bulbs, not the flowers.
- ⌚ A tulip bulb is an asset just as much as any other productive, physical capital good, such as a tractor or a factory. The bulb can last for years and produces a valuable product over and over. Once we view the tulip bulb as an asset, it's not so far-fetched for there to be an organized market for the asset, nor that some of these bulbs could be quite valuable because of their scarcity and the status they gave to their owners.
- ⌚ Because modern preservation techniques weren't available at the time, tulips could be out of the ground for only a few months during the summer. If they were dug up after the flower bloomed—for example, in June—they'd have to be replanted by September or the bulb would die. This meant that the market for tulip bulbs was usually active only during the summer months, when they could be dug up, sold, and replanted.
- ⌚ Furthermore, the marketplace was what financial economists call a tiered market. The top tier consisted of broken bulbs that sold for very high prices, even before the tulip bubble. The other market tier was for standard tulips. These bulbs were sold in quantity, by the pound or by the bucket. And their prices were much lower; a single standard bulb might sell for just a few pennies.
- ⌚ Most historians claim that the tulip bubble occurred between 1634 and early 1637. That's because the prices of broken bulbs started to rise significantly in 1634 as tulips gained in popularity. But economist Peter Garber, a tulip bubble skeptic, presents a strong case that the bubble didn't really start until mid-1636. Garber closely analyzed the data on tulip bulb prices before, during, and after the time of this mania, and the evidence suggests that broken bulbs had been rising in price for quite a while before the supposed period of the tulip bubble.

Today, we know that the broken bulbs so highly prized in 16th-century Europe were actually infected by a mosaic virus, which was responsible for the slow growth of the bulbs and the unusual floral patterns. But at the time, it was a mystery how broken bulbs were created.



- ❖ Very different behavior was demonstrated by the prices of broken bulbs and standard bulbs. The prices did not increase at the same rate, and standard bulbs didn't take off until long after the prices of broken bulbs started to increase. Part of what might explain this is tulip bulbs began to be traded in a new way, starting in mid-1636. This new way of trading didn't replace the traditional tulip market, though. It was a separate market that operated according to its own rules.

THE DUTCH STOCK MARKET

- ⌚ The Dutch were among the first to develop a modern stock market. And although the purpose of the stock exchanges in cities like Amsterdam was to enable investors to trade shares, once you got a bunch of traders in a room, some traders couldn't resist the opportunity to make money by trading anything they could, including things they didn't own at the time. They'd buy or sell shares for delivery at some future date. This is a forward, or futures, contract.
- ⌚ An agreement to buy something in the future was legal in Holland at the time. But selling something you didn't own wasn't. The only people who were legally allowed to sell stocks, or any other asset, for future delivery were those who already owned the assets. The idea behind this was that selling something you didn't yet own was pretty close to gambling, which was considered immoral. And they had a point—at least about the gambling.
- ⌚ Traders who sold shares for future delivery generally weren't interested in buying shares and delivering them to a waiting customer. And, for the most part, people buying the futures as a speculative investment weren't interested in taking delivery, either.
- ⌚ At the end of the contract, the buyer and seller would settle up in cash, rather than the physical commodity, based on the change in the market price between the start and end of the contract.
- ⌚ People started to trade tulips in this way, beginning in mid-1636. They didn't do this on the formal exchanges, because futures trading wasn't supposed to be allowed. Also, people were contracting in tulip bulbs, not shares of companies, so different groups of traders began to meet together in taverns.
- ⌚ Unlike in modern futures markets, traders in these taverns never really had to put their money where their mouth was. They didn't have to put much money down, and the contracts weren't legally enforceable. So, there's hardly any downside in getting carried away in bidding, and you might make some money on the deal.

Traders in the futures markets are betting on the directions of future price changes: Buying means you think prices will rise, and selling short means you think prices will fall.

- ⌚ This casino-like setting helps explain why the bubble focused on standard tulip bulbs instead of the broken ones. These bets had a lot of upside potential because the prices started so low, but this also kept the stakes relatively small, at least at first. In turn, this probably helped attract a lot of people to the trade.
- ⌚ The tulip bubble collapsed during the second week of February 1637, perhaps because people realized that the stakes were starting to become large enough to matter. Already by the first week in February, a pound of common tulip bulbs was worth hundreds of Dutch guilders, which was probably an intimidating amount of money to lose for most traders. Plus, bubbles have a self-fulfilling element of prophecy about them.



Weak punishments make for strong incentives to take on excessive financial risks throughout history, and the tulip bubble is a great example of what happens when people who participate in the financial markets aren't required to have enough skin in the game.

- ⌚ We don't know why the tulip bubble burst when it did, but once it did, it became impossible to buy or sell tulip bulbs, because buyers and sellers couldn't agree on prices. People simply walked away from their contracts or paid a few percent of what they supposedly owed.
- ⌚ Even though bursting bubbles usually do a significant amount of damage to individuals, and even entire economies, it's hard to find evidence of many people being financially ruined because of the tulip bubble. And there's no real indication that it affected Holland's economy. Because the trades were almost all hot air, with very little cash behind them, not much was lost when the bubble burst. Tulip prices for standard and broken bulbs soon returned to about what they had been before the bubble, so the bubble didn't damage the traditional market for tulip bulbs either.

SUGGESTED READING:

Garber, *Famous First Bubbles*.

Posthumus, "The Tulip Mania in Holland."

QUESTIONS TO CONSIDER:

1. In gambling, people talk about the "house money effect." Look up this term online if you're not familiar with it. In the case of the tulip bubble, do you think the house money effect played a role in driving up tulip prices, especially given what you learned about how the bidding process worked? Why or why not?
2. One interesting historical detail that some authors mention in connection with the tulip bubble is the fact that there was an outbreak of bubonic plague in Amsterdam during this time. Do you think that this would have made people less risk-averse and more likely to engage in speculation? Why or why not?

THE SOUTH SEA BUBBLE

LECTURE 5

The South Sea Company went from an obscure British trading organization in the early 18th century, with a share price of £128, to England's most important company, with its shares trading at more than £1000—over the course of just 6 months. The company was at the center of one of history's most interesting stock bubbles, one largely built on stock price manipulation and corruption. The South Sea bubble is a complex, fascinating story about the early days of the stock market in England and a cautionary tale about the dangers of mixing private enterprise and government finance.

THE SOUTH SEA COMPANY AND CORPORATE CHARTERS

- ⌚ The events associated with the South Sea bubble mostly took place between 1720 and 1721. Joint-stock companies—as larger corporations were called at the time—were still fairly uncommon, because it was up to Parliament to grant each one a charter, which granted special economic privileges to the licensed company. In return, the government received a share of company profits and often a lump sum of cash on top of that, a fee for granting the charter.
- ⌚ At the time, British military costs were outstripping tax revenues. In 1696, for example, the cost of war with France exceeded all of Great Britain's government revenues. One of the traditional ways that governments looked for new ways to fund themselves was to debase the currency, either by clipping off the edges of existing gold and silver coins or by reminting existing coins and mixing the gold or silver with base metals.
- ⌚ When the government resorted to this in 1696, it led to massive hoarding of coins, which in turn caused a credit crunch and a collapse of stock prices. This signaled that the government would have to try other ways to fund its activities.
- ⌚ In 1693, the British Parliament borrowed a trick from the Dutch and extended its own guarantee of payment to government borrowings. This allowed Britain to keep spending more than it took in, and it did just that. As a consequence, by 1714 the national debt was estimated to be £48 million, an amazing sum of money for the time.
- ⌚ The national debt plays a critical role in the story of the South Sea bubble. Parliament knew it had to do something to stop the growth of government borrowings and, if possible, pay down existing debt. And that brings us to the policy of selling corporate charters.
- ⌚ The South Sea Company was founded in 1711, with a monopoly on trade with Latin America. The only problem was that Britain was at war with Spain and France at the time, so the monopoly wasn't worth much. But the founder and governor of the South Sea Company, Robert Harley, was also chancellor of the Exchequer—essentially, the minister of finance—and a powerful politician.

- ⌚ Harley steered Britain to conclude a peace agreement in 1713. Under the deal, Spain awarded Britain a concession called an asiento, which was a monopoly over the slave trade in Spain's New World colonies, and became part of the South Sea Company's larger monopoly on trade with Latin America.
- ⌚ The company also gained the right to establish outposts in the New World, including factories to produce goods to sell back in Europe. And it could export goods from Britain to the New World, both legitimately and through smuggling. Furthermore, if Spain's hold over its New World colonies weakened, then the South Sea Company would be very well placed to assert control—backed by the British navy, of course.
- ⌚ To obtain its charter, the South Sea Company had to give something to the British government. This “gift” was to persuade the holders of more than £9 million worth of short-term British government debt to exchange their investment in government paper for speculative shares of the South Sea Company.
- ⌚ This was a good deal because the exchange moved about 20% of the government's debt out of the hands of thousands of investors and into the hands of one lender: the South Sea Company. This made it much easier for the government to negotiate with its creditors. In addition, the government would pay the South Sea Company a lower interest rate on its debt than it had paid to the individual lenders—about 5%, instead of 9%.



- ⌚ Investors liked the deal, too, as long as the South Sea Company had good prospects. They would receive dividend-paying shares in a company that appeared to have a profitable future.
- ⌚ Keep in mind that holding government debt in the early 18th century wasn't comparable to holding modern central bank and treasury securities, which frequently are virtually risk-free. Back in those days, governments often got behind on their payments and you couldn't do much about it.
- ⌚ To make matters worse, it was difficult for an individual investor to sell government bonds to someone else. Before 1694, it wasn't allowed at all. On the other hand, the shares of private companies could be traded in an active and liquid market centered on the coffeehouses of Exchange Alley, or Change Alley, in London.
- ⌚ Finally, not only did the South Sea Company earn interest on the debt, but the government paid it fees simply for providing this debt consolidation service.

JOHN BLUNT AND THE SWORD BLADE COMPANY

- ⌚ During the first few years of operation, the South Sea Company didn't make very much money on trading. The Spanish charged high taxes on the slaves and goods the company transported to the New World. And Great Britain's Queen Anne took a big cut of the revenues. But by 1717, things were looking up. The trade picture with South America was improving, and the government had sorted out its affairs enough to fund interest payments.
- ⌚ This was perfect timing for a man named John Blunt, a charming man who worked for a young company called the Sword Blade Company, which had been established in 1691 to make French-style swords. In 1710, acting on behalf of the company, Blunt persuaded the chancellor of the Exchequer, Robert Harley, to reintroduce lotteries to fund the government. Don't forget that Harley would later become the governor of the South Sea Company.
- ⌚ Blunt and the Sword Blade Company designed the lotteries and ran them—and earned fees for doing so. And the lotteries had to offer lucrative prizes, usually in the form of annuities, or multiyear payments. This raised cash but left the government saddled with even more long-term debt.

- ⌚ In 1711, only a year later, 2 key events took place: Five members of the Sword Blade Company's board of directors, including Blunt, became involved in creating the South Sea Company; and the Sword Blade Company basically transformed itself into a bank and, as such, would play a key role in the bubble.
- ⌚ Blunt wasn't able to make much of a mark on the South Sea Company until 1718, when 2 of the company's top directors died, leaving him as head of the most powerful faction on the company's board. The next year, the South Sea Company struck another deal with Parliament to take over an additional slice of the national debt. It did so by getting holders of the debt to exchange their claims for an additional set of newly issued South Sea shares.
- ⌚ The form of debt that the South Sea Company now converted consisted of the annuities that had been given out as lottery prizes in that first lottery the Sword Blade Company had run for the government. The conversion was so successful that it enabled the South Sea Company to lend the government half a million pounds as an additional part of the deal. And that money came from the conversion itself.
- ⌚ Whenever the South Sea Company obtained permission from Parliament to issue new shares, British lawmakers would dictate the number of shares that could be issued and the minimum price that the shares would be issued for. This price became the face value, or par value, of the shares. This was to ensure that the new shares would be sufficient to cover the value of the debt that the government wanted to convert.
- ⌚ But the company was also free to issue the shares for a higher price than their par value if the market allowed. And this could lead to cash profits for the company. This is precisely the financial maneuver that Blunt wanted to use to grow the South Sea Company—and make himself rich. And he would use this strategy on an unprecedented scale in 1720.
- ⌚ As part of Blunt's master plan, he proposed to exchange all remaining British government debt—that is, all the debt not already held by the South Sea Company—for stock in his company.
- ⌚ Two other large institutions—the East India Company and the Bank of England, which at the time was a private company—had also been permitted to exchange millions of pounds' worth of government debt for their shares in recent years.

The strategy of profiting from exchanging government debt for company shares would work only if the South Sea Company held its share value above par and, better yet, continued to increase in value. In turn, this implies that there had to be a big unsatisfied demand for South Sea shares on the part of potential investors. There are several reasons why this existed:

The South Sea Company's trading business did have the potential to generate big profits.

The fact that the company had close ties to the government was a signal that it would continue to benefit from this relationship and be protected in case things went badly.

There was a lot of public interest in investing in joint-stock companies and not many companies to choose from.



Under Blunt's plan, the South Sea Company would get to take over the debt held by these other 2 companies, as well as all the debt held by individuals.

- ⌚ Blunt's bet, therefore, was both a get-rich-quick scheme and also a fairly transparent attempt to reduce the Bank of England's power and influence in favor of Blunt's bank, the Sword Blade Company.
- ⌚ Needless to say, the Bank of England and the East India Company complained to Parliament, and the plan was scaled back. Still, the South Sea Company was allowed to convert all government debt that hadn't already been purchased by the Bank of England, the East India Company, or the South Sea Company. This was about £30 million worth.
- ⌚ The Bank of England responded by entering into a bidding war with the South Sea Company for the privilege of converting this debt. Each company offered to accept lower interest rates from the government and also promised to give the government a big lump-sum payment.
- ⌚ The South Sea Company won by offering the government an interest rate of 5% for the first 7 years and 4% thereafter. It also offered to pay the government up to £7.5 million, depending on how much of each kind of government debt was exchanged.
- ⌚ So, the total value of the government debt to be exchanged was about £30 million. The South Sea Company was promising to rebate a quarter of the obligation right after conversion, and the interest income it would receive amounted to only about £1.5 million a year. The only way it could pull this off would be if the shares of the South Sea Company sold for well above their par value. And that's exactly what Blunt had in mind.

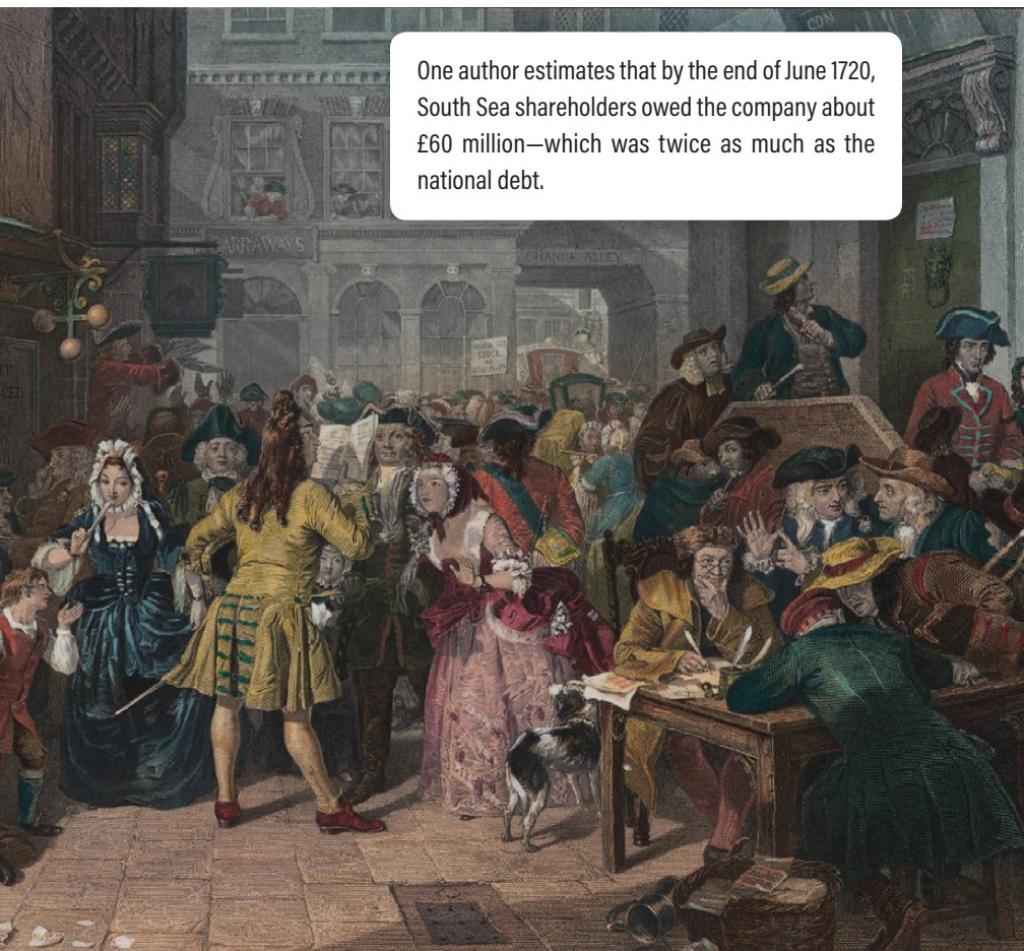
MONEY SUBSCRIPTIONS

- ⌚ In April 1720—before exchanging any of its shares for debt—the South Sea Company started selling shares to the public for cash at a price of £300 per share. And buyers needed to put only 20% down and pay the rest in installments. At the time, the shares were trading for about £170 each, up from about £120 in January.

- ⌚ Historians call this the first money subscription, because the shares were being sold for cash instead of exchanged directly for government bonds. We don't know exactly how many shares were sold, but the total par value of the shares was £2 million, so it was a substantial number of shares.
- ⌚ It sold out in 2 hours, and the market price of shares responded by rising above £300. A second sale at the end of April called the second money subscription also sold out, at the same price.
- ⌚ But remember that the South Sea Company shouldn't have been able to issue shares without exchanging them for debt right away. After all, that was the original purpose of the deal.
- ⌚ The South Sea Company was allowed to do this because they had paid about a million pounds in bribes to members of Parliament and government bureaucrats—nearly all in the form of South Sea Company shares.
- ⌚ The quick sale of South Sea Company shares to the general public—and the jump up in price—created quite a buzz. When the company subsequently got around to exchanging its shares for government debt, debt holders rushed to trade their government IOUs for South Sea shares, and the market price rose to even higher levels.
- ⌚ Now, people who had bought at 300 were rich—at least on paper. By mid-June 1720, the market price was up to £750.
- ⌚ This was the moment when Blunt went big. The South Sea Company offered another large block of shares at a price of £1000 a share. In this sale, called the third money subscription, people could put only 10% down, and the next payment wasn't due for a year. The market price of South Sea shares zoomed to £1000 and, by the end of June, was at £1050.
- ⌚ Remember, this was a company that wasn't making any profits to speak of on its trading business. And their only other source of revenue was the interest the government paid on its debt, amounting to a little more than £2 million a year.
- ⌚ In the background, the machine powering the huge increase in price was running out of fuel. Although the public had been clamoring for South Sea shares and demand was pushing up the stock's price, the main driving force

had been Blunt's manipulation of the market. He'd fueled the speculative fire by selling shares on credit. And the terms became more and more generous with each new offering.

- ⌚ At the same time, the South Sea Company even offered to lend money to its shareholders if the shareholders posted their stock as collateral. So, many people took the company up on this. Although South Sea was raising millions of pounds through the stock sales, all of it was going back out the door in the form of loans to shareholders.
- ⌚ To top things off, the company was repurchasing its own shares in the market. To do so, it was borrowing money from its partner bank, the Sword Blade Company. This couldn't last forever.



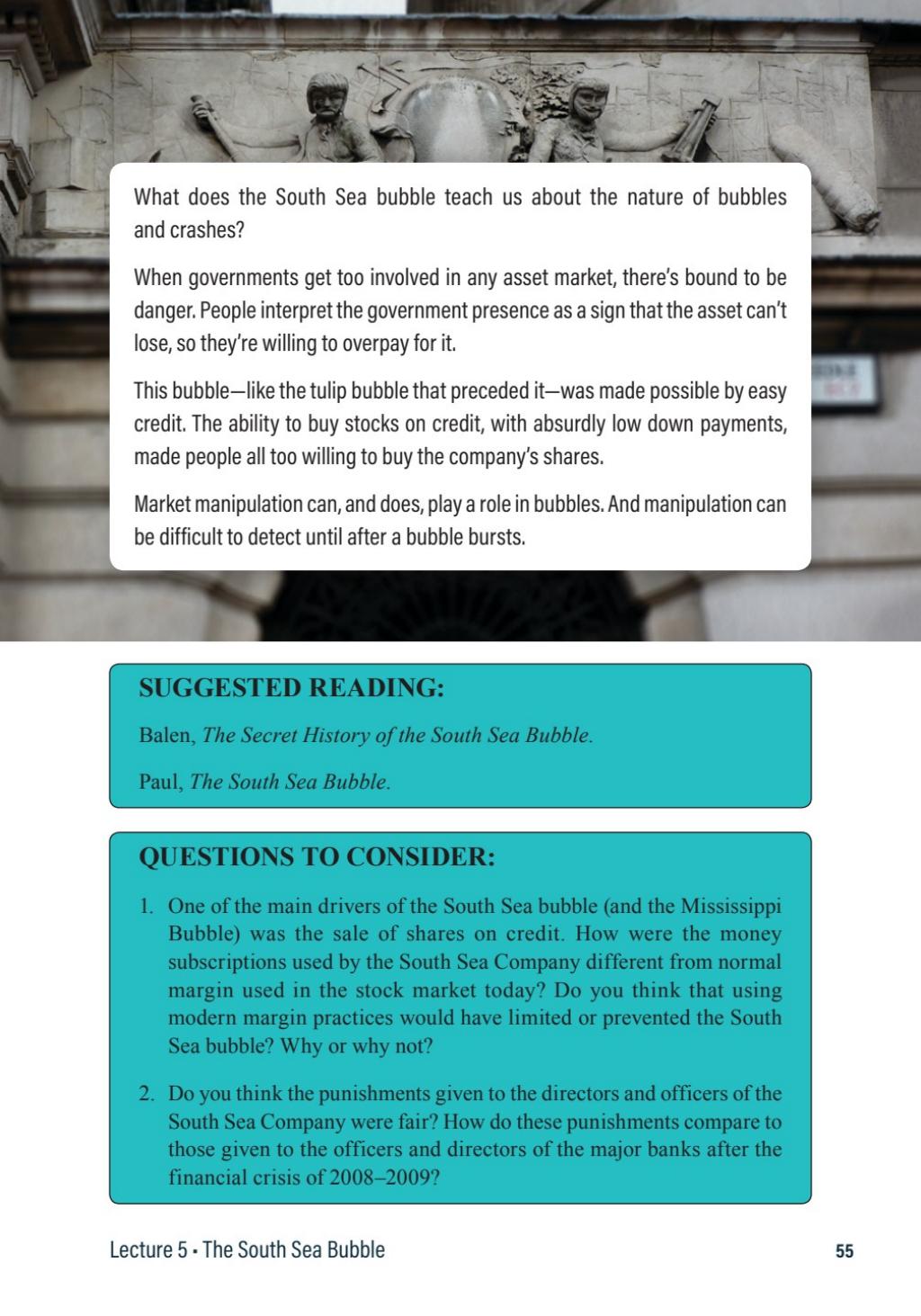
One author estimates that by the end of June 1720, South Sea shareholders owed the company about £60 million—which was twice as much as the national debt.

THE BUBBLE ACT

- ⌚ It's fairly impressive that in the 2 months after the third money subscription, the shares barely drifted lower, to less than £900 per share. But something else would now contribute to taking the air out of the South Sea bubble: legislation called the Bubble Act.
- ⌚ This law was actually intended to help support the price of South Sea's shares by eliminating competition. As public excitement had grown, other entrepreneurs saw their chance to start joint-stock companies. More than 100 new ventures were launched between April and June 1720.
- ⌚ But most of these either didn't have a government charter or misused the charter of an old company. Technically, they were operating outside of the law. So, Parliament pushed through the Bubble Act in June 1720 to close these companies down.
- ⌚ But once the law began to be enforced, investors who had bought the shares of these newer companies faced big losses. And just like many shareholders of the South Sea Company, these investors had borrowed money or bought their shares on margin. So, they sold their shares in the South Sea Company to get the cash they needed to pay off these other obligations.
- ⌚ Blunt tried a series of desperation moves to prop up the South Sea Company's stock price. On August 24th, when the share price was still just less than £900, he offered a new issue of stock at an above-market price of £1000 per share. This was an attempt to signal management's confidence.
- ⌚ The company sold £1 million worth of shares, though mostly on credit, as before. Then, on August 30th, the company announced higher dividend payments, including a 30% dividend at the end of the current year and a 50% dividend for the next 12 years. This committed the company to paying out between £10 and £15 million in cash each year.
- ⌚ Some historians think that this promise was so over the top that it convinced people to sell. But the effects of the Bubble Act were also important. And don't forget that a lot of stock had been issued at a price of only £300 a share; many of those people probably wanted to cash out their profits while they still could. For all of these reasons, the price of South Sea shares plummeted.

- ⌚ On September 1, 1720, they traded at £770. Within a few days, the price fell by more than half, to £370. And by September 10, the price fell by more than half again, to £180 a share. Paper fortunes were lost, and huge debts were created for thousands of people who had bought shares on credit.
- ⌚ Many of these included members of Parliament and other government officials who had bought during the third subscription, at a price of £1000 a share. Some people had borrowed against their shares to purchase homes, carriages, and jewelry. All of this had to be sold at fire-sale prices to cover debts.
- ⌚ The public was outraged and wanted action. Parliament formed a special panel of inquiry and brought in the South Sea Company's directors for questioning. But then the treasurer fled the country, taking the most incriminating financial records with him, and all directors of the company were taken into custody.
- ⌚ Because Parliament was in a mood to dole out punishment, Blunt began to spill the beans about all the bribes that had been taken. So, Parliament backed down a bit and went after the directors' assets instead of sending them to jail, recovering about £2 million. Each director was allowed to keep a small fraction of his assets.
- ⌚ Interestingly, the South Sea Company didn't collapse. But it did have to be bailed out by the Bank of England.
- ⌚ In the end, people who had bought shares on credit kept an equivalent number of shares based on what they had paid to date and a price of £300 per share. People who had borrowed against their shares were allowed to pay 10% of what they owed and give up their shares in return for having the debt canceled.
- ⌚ Afterward, the South Sea Company still held a large chunk of the national debt and tried to make a go of its trading business. The company muddled on for more than a century and was finally wound down in 1854.

On average, people who had invested in South Sea shares during 1720 lost half of what they put into the company.



What does the South Sea bubble teach us about the nature of bubbles and crashes?

When governments get too involved in any asset market, there's bound to be danger. People interpret the government presence as a sign that the asset can't lose, so they're willing to overpay for it.

This bubble—like the tulip bubble that preceded it—was made possible by easy credit. The ability to buy stocks on credit, with absurdly low down payments, made people all too willing to buy the company's shares.

Market manipulation can, and does, play a role in bubbles. And manipulation can be difficult to detect until after a bubble bursts.

SUGGESTED READING:

Balen, *The Secret History of the South Sea Bubble*.

Paul, *The South Sea Bubble*.

QUESTIONS TO CONSIDER:

1. One of the main drivers of the South Sea bubble (and the Mississippi Bubble) was the sale of shares on credit. How were the money subscriptions used by the South Sea Company different from normal margin used in the stock market today? Do you think that using modern margin practices would have limited or prevented the South Sea bubble? Why or why not?
2. Do you think the punishments given to the directors and officers of the South Sea Company were fair? How do these punishments compare to those given to the officers and directors of the major banks after the financial crisis of 2008–2009?

THE MISSISSIPPI BUBBLE

LECTURE 6

In 1720, a Scotsman named John Law was put in charge of the entire French economy and given free rein to put his ideas about money, banking, and finance into effect. Law did get the French economy moving, but along the way, he also helped create one of history's most famous, and least understood, financial bubbles: the Mississippi bubble. This market dislocation didn't have much to do with Mississippi, but it does show what can happen when governments put radical economic theories into practice on a large scale.

JOHN LAW'S GENERAL BANK

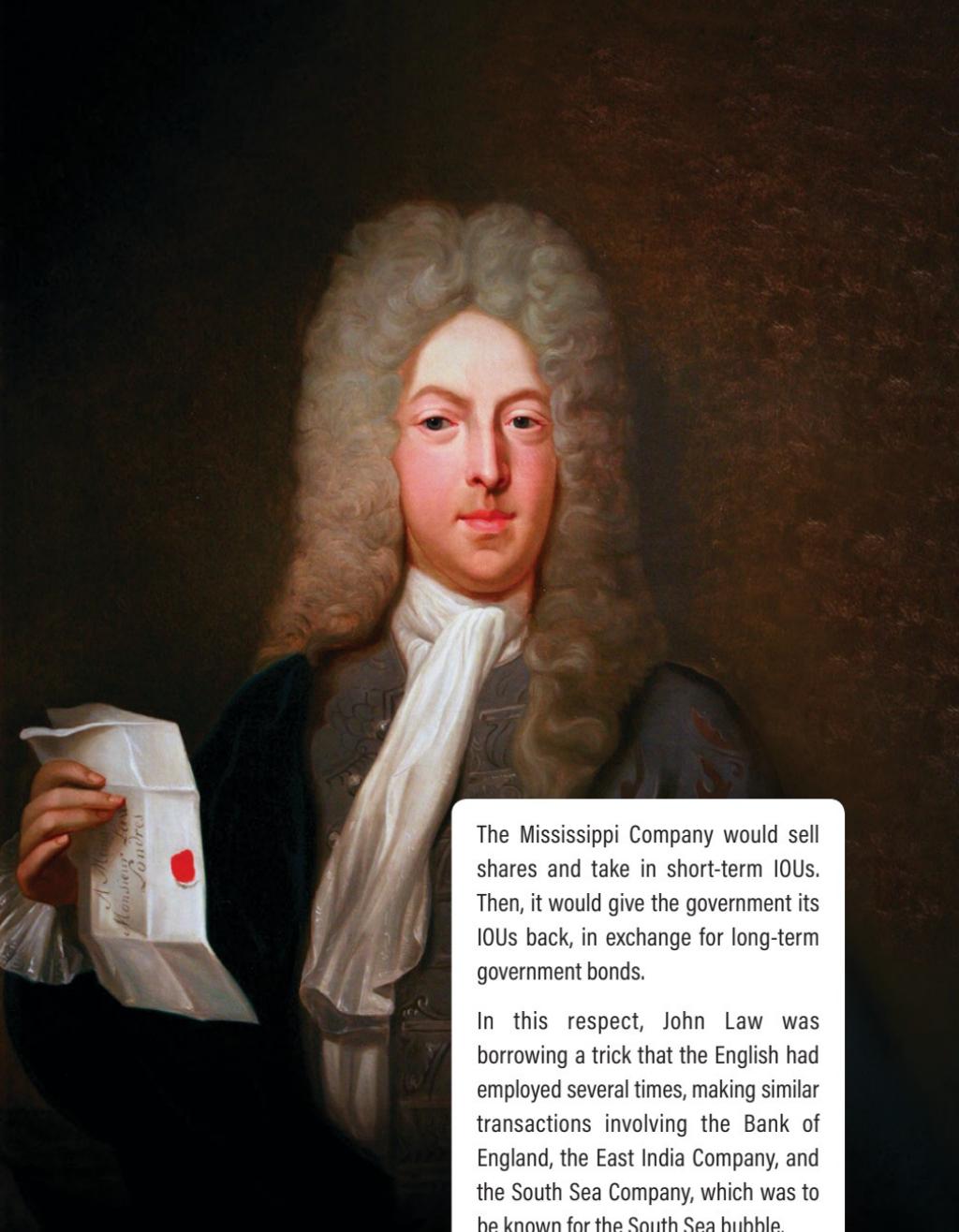
- ⌚ The War of the Spanish Succession, which had dragged on for more than a decade before the peace treaty of Utrecht was concluded in 1713, had exhausted France's resources. The government was about 3 billion francs in debt. Most creditors had simply stopped lending money to the French government. In desperation, it had already persuaded landholders to pay their property taxes for 5 years in advance.
- ⌚ The French economy was also in shambles. High taxes were levied on almost every conceivable activity, stunting commerce and entrepreneurship. And many farms and fields stood empty, because their owners had fled to avoid being conscripted into the army. Poor harvests compounded the hardship, causing yet more people to flee to avoid starving.
- ⌚ In 1715, when France's King Louis XIV died, his successor, Louis XV, was only 5 years old, and the Duke of Orleans served as regent to the young king. The regent sought the advice of his friend John Law, a Scotsman with great financial acumen, about how to pay down the national debt and fix the economy.
- ⌚ Law's plan centered on the creation of a royal, or national, bank. It would issue shares to raise money to buy the outstanding debt back from the current debtholders. Unfortunately, the regent needed the assent of the entire council of regency to create a national bank, and he couldn't persuade key members of the council to go along. But he was able to get them to agree to let Law start his own private bank.
- ⌚ Law's Banque Générale ("General Bank") opened its doors in 1716 and was organized as a joint-stock company that raised its initial capital by selling shares to the public. It was allowed to issue paper notes, take deposits, and make commercial loans, but it was forbidden from financing international trade or providing insurance.

In 1713, the French government was about 3 billion francs in debt, or the equivalent of about 200 million English pounds. By comparison, the national debt of England at that time was 40 million pounds, and its government was struggling to make payments on even that amount.

- ⌚ Interestingly, part of the deal underlying the bank's formation was that Law was required to accept government IOUs, called *billets d'état*, as partial payment for the shares the bank issued. This helped relieve the government debt crisis a little, by consolidating a big chunk of its outstanding obligations in friendly hands.
- ⌚ Although we don't have any written evidence that Law and the regent were working on a master plan together, there is plenty of evidence that the men were close. And from this point onward, the regent's decisions increasingly favored Law—and whatever operations he was involved in.

THE RISE OF THE MISSISSIPPI COMPANY

- ⌚ In August 1717, Law received a charter from the French government to form Compagnie d'Occident ("Company of the West") to take over the administration of the French territory of Louisiana in North America, consisting of the Mississippi, Missouri, and Ohio river basins. This land would later be sold to the US government as the Louisiana Purchase. In addition, the company was granted the monopoly over the trade in beaver pelts in French Canada.
- ⌚ This enterprise would soon be better known by its nickname: the Mississippi Company. The company would issue shares, and people who bought them would have to use short-term French government IOUs to make the purchases. This was basically a scheme to encourage the public to exchange the government IOUs they were currently holding for shares in the joint-stock company.
- ⌚ The goal was to exchange half of the existing short-term IOUs. Once the Mississippi Company shares were purchased, the short-term IOUs now in the hands of the company would be exchanged for new long-term government bonds paying a lower rate of interest.
- ⌚ Even though the Mississippi Company had the right to exploit new opportunities in a vast area of the New World, and even though people could trade highly depreciated government IOUs for new shares, it was difficult at first to convince people to buy the shares. It took almost a year to get enough investors to buy up the total number of shares offered.



The Mississippi Company would sell shares and take in short-term IOUs. Then, it would give the government its IOUs back, in exchange for long-term government bonds.

In this respect, John Law was borrowing a trick that the English had employed several times, making similar transactions involving the Bank of England, the East India Company, and the South Sea Company, which was to be known for the South Sea bubble.

- ⌚ That's because the right and opportunity to exploit Louisiana's riches had already been sold once before—to Antoine Crozat, one of France's most successful businessmen. But Crozat had returned this concession to the government, because he had been unable to make any profits from Louisiana.
- ⌚ The next step in Law's plan was to start a nonfinancial company. The national debt was crippling the economy, and his private bank was never going to grow quickly enough to buy up and hold the national debt by itself. A royal bank might be able to raise funds through a sale of shares, but there wasn't enough support for this plan in the council of regency. The only other option might have been to start a new private nonfinancial company and raise enough money through stock sales to buy up all the national debt.
- ⌚ But the Mississippi Company wasn't in any position to offer more of its own shares. It had barely sold out its initial public offering, and the shares soon began to trade at much lower prices.
- ⌚ But here's where a direct connection to the government came in handy: In August 1718, the regent began to award extremely valuable privileges to the Mississippi Company and would continue to do so over the next year. Soon, the company was awarded the tobacco monopoly and the monopoly on trade with Africa.
- ⌚ These awards attracted some favorable attention for the company, but one event in particular seemed to be a catalyst for public excitement: In early 1719, when the shares of the company had risen but were still trading at half their original price, Law publicly offered to buy shares at the original price of 500 in 6 months' time.
- ⌚ He posted 40,000 francs of collateral that he would forfeit if he broke his word. Basically, Law promised that if people bought shares, they'd double their money in 6 months. This captivated the public, who began to bid up the share price.
- ⌚ Law's bet signaled that he was extremely confident in the company's future. And the signal was credible because he stood to lose a huge amount of money if he was wrong. Therefore, it shouldn't be surprising that the public started to become very interested in buying the company's shares.

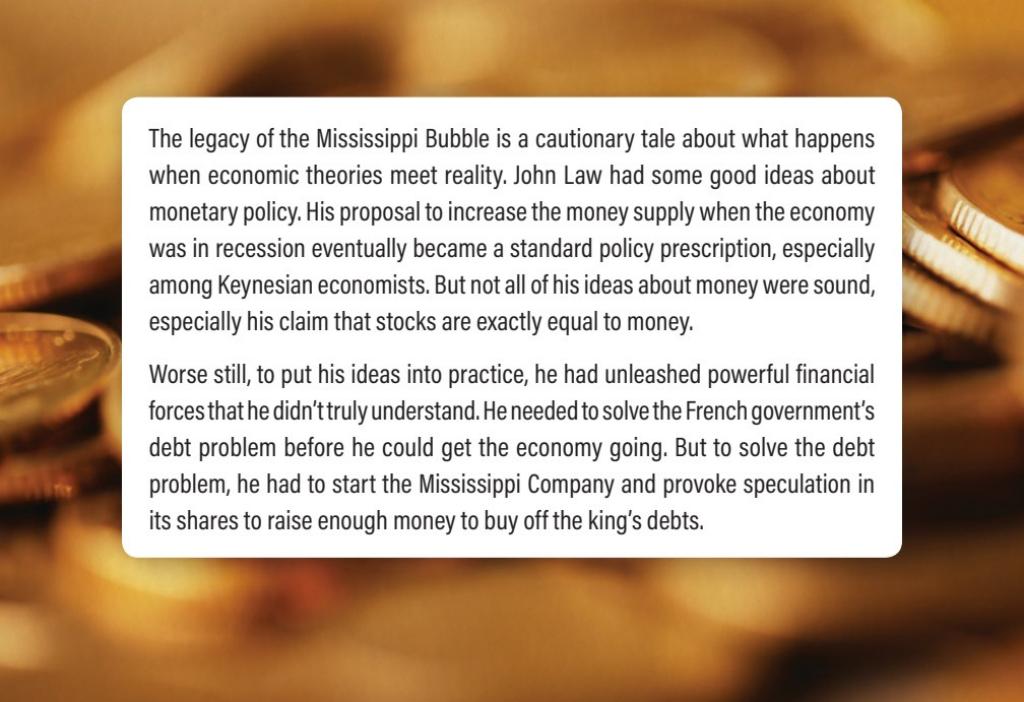
- ⌚ Subsequent privileges awarded to the Mississippi Company seemed to validate Law's optimism. In May 1719, the company was allowed to take over the French East India Company and the China Company, which held the monopoly over Far East trade. The Mississippi Company changed its formal name to Compagnie des Indes ("Company of the Indies") and held the French monopoly over tobacco, tax collection, and trade with the non-European world.
- ⌚ The Mississippi Company didn't receive these benefits for free, though. It had to pay for all the monopoly rights and was allowed to issue new shares to do so. These follow-up share offerings really started to move the share price.
- ⌚ First, in June of 1719, the company was allowed to issue new shares to finance its mergers with the East India and China Companies. These shares were offered at a price of 550 francs, but a person had to pay only 75 francs up front and the rest in monthly installments.
- ⌚ Then, there was so much demand that Law put in a requirement that to buy the new shares, a person had to already own 4 of the original ones. This was genius, because it forced people who wanted the new shares to first buy up existing shares. The price started to jump. And by the end of August, the share price was 1000 francs per share.
- ⌚ Next, Law repeated this tactic. He issued another set of shares at the 1000-franc share price, again on credit, and again required that people who bought the newest issue must already own shares from the previous 2 issues. With this, the price of the shares really started to climb, rising to 5000 francs by October—a 400% gain in 2 months.
- ⌚ With a virtual frenzy for Mississippi Company shares unfolding in the public marketplace, Law seized his chance to refinance the French national debt. Although about half the national debt had been consolidated by the General Bank and the Mississippi Company, there was still about 1.5 billion francs of long-term debt in public hands.
- ⌚ This was mostly in the form of very long annuities, paying a good interest rate. But Law was determined. He issued 150,000 shares at a price of 5000 francs per share. Once again, the shares were sold on credit—10% down—although this time it wasn't necessary to force people to hold previously issued shares because demand was so high.

- ⌚ The money raised by this share issue was loaned to the government, which would buy back the outstanding annuities from the public and have a long-term, low-interest loan from the Mississippi Company in its place.
- ⌚ Despite the repeated share issuances, the stock price kept rising. By November of 1719, the market value of one Mississippi Company share had reached 10,000 francs.
- ⌚ Law was the most celebrated and important man in the French economy—if not in all of France. As a reward for devising his clever system, the regent named Law the controller general of finances in January 1720. This basically put him in charge of France's economic policy. He was also the head of a company that held monopolies over a sizable part of the French economy.

LAW'S BIG MISTAKE

- ⌚ Law believed that paper money—as long as it was backed by assets such as gold, land, or even productive capital—was far superior to the metal coins in common use. In addition, he thought that by expanding the supply of paper money as a form of economic stimulus, he could drive the economy to prosperity from its current depressed state.
- ⌚ Law got the chance to put his ideas about money to work, but not quite as he intended. Human nature, combined with one big mistake in Law's theories, caused his system to go out of control and eventually collapse.
- ⌚ The human nature element that got in the way was profit taking on the part of the stock speculators who had bought into the Mississippi Company. People who had bought shares on credit when the price was 550 were sitting on huge paper profits that they wanted to realize. So, they began to sell the shares, and this started to push the share price down in the market.
- ⌚ This was unacceptable in Law's eyes, because he was convinced that paper shares of stock were also a form of money. And paper money couldn't fall in value—or, at least, it couldn't be allowed to fall in value. So, Law instructed the company to hold the price of its stock at 9000 francs a share. It would support this value by standing ready to buy and sell shares at that price.

- ⌚ Naturally, more people wanted to sell than to buy at that price. So, redemptions started to drain the company's resources. Law solved that by merging the company into the Royal Bank and issuing a series of decrees that basically forced people to accept paper money for their shares.
- ⌚ The result was a huge expansion of the French money supply in a matter of months—more than doubling to about 3 billion francs' worth between January and mid-May 1720. The result was inflation. It's difficult to get good price data, but some studies suggest that prices almost doubled during this period.
- ⌚ On May 20, 1720, Law decreed that the value of Mississippi Company stock would be reduced from 9000 francs a share down to 5000 francs a share over the next 6 months. At the same time, the rate at which banknotes issued by the Royal Bank could be redeemed for gold and silver coins would be cut in half.
- ⌚ Law did need to take steps to disinflate the economy, but doing so by decree was too much for the public to take. There was a huge outcry, and Law canceled this measure a week later. But the damage had been done. This episode turned public opinion against Mississippi Company shares, paper banknotes, and Law himself. After all, his decrees demonstrated that the value of the paper money was completely arbitrary.
- ⌚ During the summer and fall, Law continually tried to restore confidence in the shares and in the banknotes. He redeemed carefully rationed amounts of banknotes in gold coin and periodically burned the notes in public to convince people that the supply of paper money was falling. But the prices of the shares and the value of the banknotes just kept falling.
- ⌚ Public discontent over inflation, and the draconian rules that Law implemented to keep people using paper money, spawned protests that grew violent and were aimed specifically at Law and his family. The regent helped him escape France in late 1720, and he eventually settled in Venice, where he spent the rest of his life.
- ⌚ Law's departure was the end of the paper money experiment in France until the French Revolution more than half of a century later. Meanwhile, a commission was appointed to buy back paper money and shares from people who held them. But by then, the values had fallen so much that people could hope to recover only a small fraction of their investment.



The legacy of the Mississippi Bubble is a cautionary tale about what happens when economic theories meet reality. John Law had some good ideas about monetary policy. His proposal to increase the money supply when the economy was in recession eventually became a standard policy prescription, especially among Keynesian economists. But not all of his ideas about money were sound, especially his claim that stocks are exactly equal to money.

Worse still, to put his ideas into practice, he had unleashed powerful financial forces that he didn't truly understand. He needed to solve the French government's debt problem before he could get the economy going. But to solve the debt problem, he had to start the Mississippi Company and provoke speculation in its shares to raise enough money to buy off the king's debts.

SUGGESTED READING:

Balen, *The Secret History of the South Sea Bubble*.

Murphy, "John Law."

QUESTIONS TO CONSIDER:

1. The experience of the Mississippi bubble raises interesting questions about what assets, if any, should be used to back a country's money. Do you think that a land bank would be a better or worse method than gold to back a country's money? Are either of those assets preferable to having a purely fiat money? Why?
2. Do modern governments ever privatize some of their debts? If so, how and under what circumstances? Do you think these privatization programs could ever be scaled up to handle the entire national debt of a large country like the United States? Why or why not?

HOLES IN THE GROUND: MINING STOCK FRAUDS

LECTURE 7

During the late 19th and early 20th centuries, the world of minerals exploration and mining was a magnet for some of the greatest talent in America, including the most talented con artists. The schemes they cooked up ensnared countless small investors, as well as some of the greatest business leaders in the country. In fact, one fiasco nearly destroyed the business career of a future US president.

WHY MINING STOCKS?

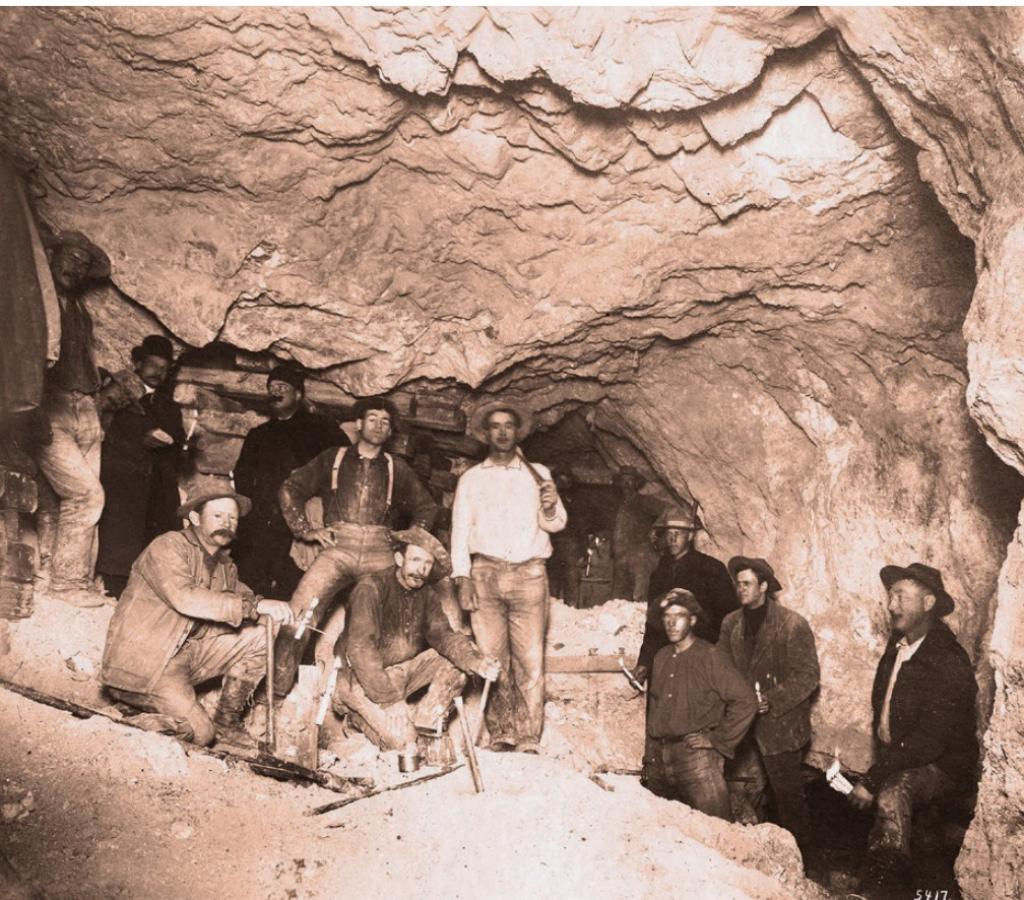
- ⌚ Railroad and mining concerns were high-tech companies during the rapid industrialization of the 19th century. Railroads were mostly reserved for wealthy investors, though, because they required enormous up-front investments to purchase rights of way, lay track, and order locomotives.
- ⌚ Mining, on the other hand, offered opportunities for even small investors to strike it rich, either as a miner or a stockholder. Any person could stake a claim; it took only some simple tools to get started. And even though successful mines could become capital intensive, they still didn't require nearly as much capital as a railroad did. The comparatively low cost of starting a mining company meant that hundreds and hundreds of mining companies were founded.
- ⌚ And the upside potential of a mine could be a lot higher than for railroads—again, at least from the point of view of a small shareholder. If you held shares in the lucky mine that struck a rich vein of ore, then the price of the shares would skyrocket.
- ⌚ The profits from one good mining company could make up for losses on all the others that you may have staked or invested in. And this possibility was a very powerful incentive for people to invest in mining shares despite the risks.
- ⌚ Another important factor was that luck played a major role in the success of a mine. Even though geology and mining technologies were developing rapidly in the late 18th and early 19th centuries, it was still extremely difficult to tell whether any particular mine prospect would uncover a significant amount of gold, silver, or other mineral.
- ⌚ This element of randomness helped maintain the public's interest in mining and mining stocks for a few reasons: You didn't seem to need money, connections, or special expertise to be successful; and a failure today didn't say anything about future chances of success.
- ⌚ Because mining typically was taking place in remote areas, such as the mountains and deserts of the American Southwest, the mining companies had a marketing problem: How could they reach potential investors?

- ⌚ The companies themselves were formed in the boomtowns that sprang up around the mines. In turn, just about every mining town had a stock exchange, where all the local mining shares were traded.
- ⌚ But the local stock exchanges were quite limited; there just weren't that many people who lived there. So, the mine companies would try to reach the larger investing public in the following way:
 - ⌚ First, they would list their shares on exchanges in bigger cities, which gave a mining company an air of legitimacy and helped attract investors. For the western mining companies, the main city was San Francisco. And the San Francisco Stock Exchange didn't set very high listing standards because it was happy to get the commissions from trading.
 - ⌚ Once listed, a mining company would launch a publicity campaign. The mining companies would take out advertisements both offering and promoting the sale of their shares in local newspapers, which were the main media of the day. These days, that's pretty much illegal. But before the Great Depression of the 1930s, there were few restrictions on issuing shares or making claims about them. The advertisements touting the potential payout of a mine—and possibly including assayer's reports (which were frequently faked)—were placed in as many papers as the mine owners could afford.
- ⌚ The better the liar, the more shares the company could sell at higher and higher prices, giving the company's founders and other insiders a rich payoff.

GEORGE GRAHAM RICE

- ⌚ When it comes to liars, probably no person was a better prevaricator than a man who went by the name of George Graham Rice. His real name was Jacob Herzig, and he was an accomplished forger. But he ended up spending 5 years in a New York prison, where he learned more about being a con artist from an inmate named Willie Graham Rice. By the time he was released, he'd taken to calling himself George Graham Rice—the name he used the rest of his life—and headed west.

- ⌚ By the early 1900s, Rice found that he had the perfect skills to make it in the mining industry—as a stock promoter, or tout. His skill with words and his persuasive personality helped him build a highly profitable mine-promotion business within 6 months.
- ⌚ Rice gladly accepted mine shares in exchange for glowing human-interest articles about the mining towns and properties he promoted. When a new gold venture called the Montgomery-Shoshone Mine was developed in Nevada, Rice was called in by the owners and given shares and land in exchange for his maximum effort.
- ⌚ Rice was so successful that the steel magnate Charles Schwab took an interest in the property and bought it. The venture turned out to be an impressive flop—and an impressive fraud. There was a gold-bearing vein at Montgomery-Shoshone, but it was disappointingly thin.



- ⌚ And the developers had dug their mine shaft parallel to the vein, which was the opposite of the accepted practice of cutting across the vein. Cutting parallel gave the impression that the vein was much larger than was actually the case. Schwab fell for it, and dramatically overpaid. Rice, on the other hand, netted tens of thousands of dollars.
- ⌚ In 1906, the San Francisco earthquake shut down the city's stock exchange and, with it, most sales and trading of Nevada mining shares. When the exchange reopened later that year, Rice jump-started public interest in Nevada mining stocks by concocting the story that a prospector had made a huge strike on the far side of Death Valley and would sell his rights to the first person to reach him with a reasonable offer.
- ⌚ Rice purportedly raced off across Death Valley with a small crew to find the prospector before a rival agent, ostensibly sent by Charles Schwab, could reach him. This story was serialized in many newspapers, and it featured a happy ending, with Rice reaching the prospector and his fabulous gold strike just before Schwab's man did.
- ⌚ Of course, a man like Rice wouldn't be content by merely promoting mining stocks. The really big money was to be made by dealing in mines—and mining stocks—directly. So, before long, Rice formed a trust company and began to buy and market his own mining company shares.
- ⌚ The mines were always real, though they weren't any good. Still, Rice's promotions succeeded at pumping up the shares' market value long enough so that he could dump them on mom-and-pop investors, and even more sophisticated ones.
- ⌚ Nat Goodwin, who was one of America's most popular comedian actors, was persuaded by Rice to form a company to do business in mining properties and shares. Goodwin served as the figurehead of the firm, which was named after him, and he helped drum up publicity.
- ⌚ Rice served on the board of directors and actually managed the enterprise. And he used this company as the platform for his boldest pump-and-dump scheme yet. It bought up some cheap, unwanted properties in Rawhide, Nevada, which had just seen a gold strike, and formed a mining company called Rawhide Coalition Mines.



In a pump-and-dump scheme, a promoter buys up shares of a suspect company, often driving the share price dramatically higher. Then, the promoter hypes the company's prospects to unsuspecting investors, using the increase in the share price as proof. The excited investors buy shares from the promoter, who sells off, or dumps, the shares he or she bought earlier, raking in a nice profit.

- ❧ This time, rather than promoting the pump-and-dump scheme locally, Rice set his sights on a much bigger market: the New York Curb Exchange. But just before Rice was to go to New York to promote Rawhide Coalition Mines, the entire town of Rawhide burned down. He told investors that the gold was still in the ground, and people were already rebuilding. He also started a massive advertising campaign in which his ads looked like news stories and predicted that the share price would rise from 25¢ to \$2 by late 1908 and pass \$6 in a few months.

- ⌚ Rice started pushing Rawhide Coalition shares that fall, and by Thanksgiving they were above \$1 and rising. Before they could reach the \$2 mark, though, a legitimate mining publication, the *Mining and Scientific Press*, published an evaluation that identified the Rawhide Coalition properties as being virtually worthless.
- ⌚ That wasn't necessarily a problem for Rice, because he was there to pump and dump. Shares that he had acquired for 15¢ apiece he was able to unload for about \$1.40.
- ⌚ This deal established Rice in New York for good—except for a couple more visits to prison. He merged his trust company with a Chicago-based brokerage operated by Bernard Scheftels, named the firm B. H. Scheftels and Company, and opened a New York office in 1909.
- ⌚ Now Rice had an ideal platform for stock manipulation. The new company put out mining newsletters to stimulate interest in the stocks it peddled and hired an army of salespeople to peddle investments over the phone.
- ⌚ Under Rice's leadership, the B. H. Scheftels firm seemed to engage in all the practices that so-called bucket shops were notorious for: promoting fake or worthless companies; taking customers' money and not actually buying shares; and manipulating the prices of the stocks the company did own, primarily for the benefit of Rice and Scheftels.
- ⌚ The Scheftels firm also sent out tip sheets to customers through the mail, and this is what prompted a federal raid on the company in 1910. Rice eventually pled guilty to mail fraud and was sentenced to a year in prison. And the firm was closed.

A bucket shop is a brokerage that has no real connection to the stock or commodity exchanges. The patrons of bucket shops buy or sell assets in name only and essentially bet that their prices rise or fall.

There are competing stories that explain the term "bucket shop," but one is that shady operators of these fake brokerages would throw their trading tickets into a bucket and decide at the end of the day how to allocate trading prices and results.

⌚ But as soon as he was out of jail, Rice was back in business with a new bucket shop. He touted shares in newsletters and newspapers, hired lots of aggressive salespeople, and kept pumping and dumping until the next legal problems cropped up. This became the pattern for the rest of his life: Whenever he wasn't in the courtroom trying to stay out of jail, he was in the market making millions with some kind of scam.

⌚ Rice spent another 4 years in prison after a 1928 conviction, including some time with Al Capone as a cellmate. And in 1938, the feds closed in once again—on his last bucket shop—only to narrowly miss him. Rice went into hiding, presumably in New York City, until his death in 1943.

During his lifetime, George Graham Rice swindled investors out of an estimated \$500 million—the equivalent of \$6 billion today.

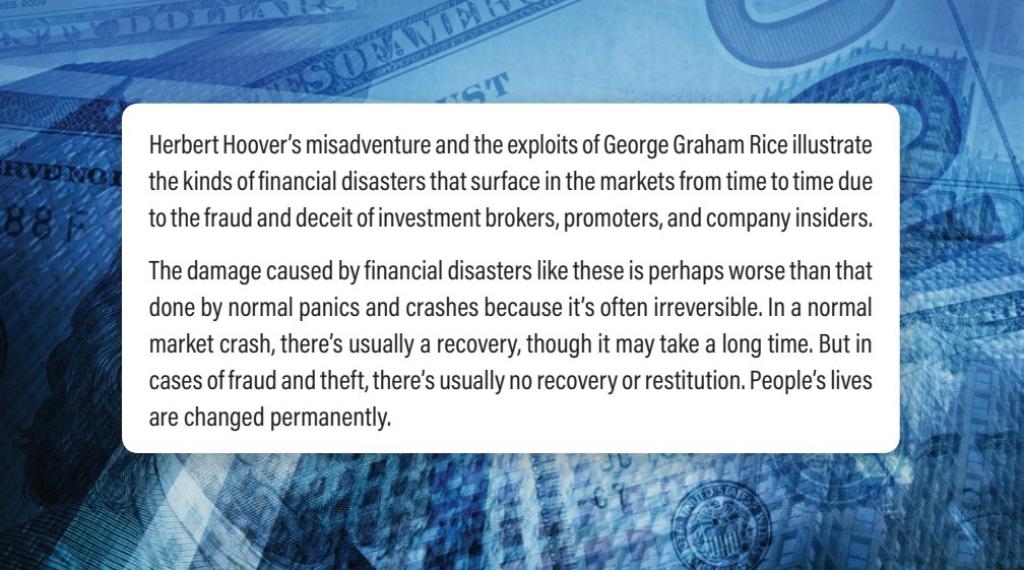
HERBERT HOOVER

⌚ Manipulating shares wasn't the only form of bad behavior in the mining industry. The managers of these companies were sometimes also a source of stock market problems. Decades before the practice of insider trading became subject to civil and criminal statutes, managers of big mining companies frequently misappropriated or speculated in their own companies' shares, sometimes at the direct expense of other shareholders.

⌚ One especially interesting case of insider trading in mining shares nearly ruined the career of future US President Herbert Hoover, who was a mining engineer. As a young man, he rapidly gained attention for applying the scientific methods he'd studied at Stanford University to the practical business of mining.



- ⌚ In 1897, Hoover started working for the British mining management firm of Bewick, Moreing and Company, based in London, and by late 1901, he became a partner in the company. The firm's 4 partners routinely served on the boards of directors of the mining companies that were its clients and even served as executives at some of them.
- ⌚ Just after the Christmas holiday in 1902, Hoover came into the London office to discover that Stanley Rowe, one of the other partners in the firm, had been hiding some insider dealings. Rowe was missing from work but had left Hoover a letter informing him that he would be resigning from the firm. A second letter, delivered to Hoover by Rowe's wife, explained why.
- ⌚ One of Rowe's duties for the company was to serve as the secretary of the Great Fingall gold mine in Westralia, as Western Australia was known at the time. He had borrowed money, and speculated on the company's shares, because he thought it had a great future. But the price fell, and he was £70,000 in debt.
- ⌚ To make matters worse, Rowe had used his position as the Great Fingall mining company's secretary to forge its stock certificates, which he had used as collateral for the loans. As Hoover dug deeper, he discovered that Rowe had also stolen thousands of shares of 2 other companies that were held in the Great Fingall's treasury. And he had embezzled about £13,000 from Bewick, Moreing and Company.
- ⌚ These revelations were enough to put the company out of business, if it didn't come up with restitution. And the market for Westralian mining shares looked like it could collapse if the damage from Rowe's thefts wasn't repaired. It had already been weakened by previous scandals.
- ⌚ In all, Rowe racked up more than £100,000 of theft and fraud. And Hoover was in no financial shape to help the company make good on any of it. He'd had to borrow money to buy into the partnership, and now he faced financial ruin because of Rowe's misdeeds. Fortunately, the senior partner, Charles Moreing, had the financial resources—and the willingness—to save the firm.
- ⌚ The remaining partners negotiated with Rowe's victims. This ended up costing them around £100,000, which Moreing paid up front. The partners repaid the money over the next few years. Hoover's share was 20%, and it took him several years to extinguish the debt.



Herbert Hoover's misadventure and the exploits of George Graham Rice illustrate the kinds of financial disasters that surface in the markets from time to time due to the fraud and deceit of investment brokers, promoters, and company insiders.

The damage caused by financial disasters like these is perhaps worse than that done by normal panics and crashes because it's often irreversible. In a normal market crash, there's usually a recovery, though it may take a long time. But in cases of fraud and theft, there's usually no recovery or restitution. People's lives are changed permanently.

SUGGESTED READING:

Nash, *The Life of Herbert Hoover*.

Plazak, *A Hole in the Ground with a Liar at the Top*.

Thornton, *My Adventures with Your Money*.

QUESTIONS TO CONSIDER:

1. In this lecture, you learned about the role of stock promoters in pushing the public to invest in low-quality or even bogus companies. Do such people still exist in the modern stock market? If so, where do we typically find these promoters? Are modern stock promoters regulated well enough to avoid the problems discussed in this lecture? In other words, have there been any scandals involving the modern versions of stock promoters?
2. One of the institutions mentioned in this lecture was the bucket shop. Look up this term on the internet and read a little about the history of these institutions. When was the heyday of this organization? Were bucket shops simply a blight on the legitimate financial markets, or did they actually serve a social or economic purpose? If so, what was it?

THE PANIC OF 1907

LECTURE 8

From American independence through the 19th and early 20th centuries, panics were a recurring feature of the domestic financial market. They occurred with astonishing regularity and often were followed by serious recessions, and even depressions. This lecture digs into the concept of financial panics by focusing on one that changed the course of American economic policy: the panic of 1907, which introduces us to one of the most famous financiers in American history—John Pierpont Morgan—and brought about an end of the era of financial panics.

LIQUIDITY

- A financial panic is the frantic attempt to find or get liquidity. In finance, liquid assets are those that flow from person to person, because most people will accept them as payment for goods and services or to settle debts. In other words, the more liquid an asset is, the better it serves as a medium of exchange. Cash is usually the most liquid asset.
- Liquidity has at least 2 different meanings in finance:
 1. The quality of being easily exchanged, usually for cash. For example, most bank deposits have high liquidity because they're easy to exchange for cash at just about any time, by making a withdrawal. Personal checks and government bonds are also highly liquid. On the other hand, assets like land may have low liquidity if it takes a long time to find a buyer who is willing to pay a fair price.
 2. The condition of having enough liquid assets to be able to pay off your anticipated expenses. When we perform a financial analysis on a company, we ask whether the firm has enough liquid assets to pay off its bills over the next 12 months. A company may own lots of assets, such as factories and land, but still not have very much cash on hand. In that case, we'd say that the company isn't very liquid.
- Liquidity, in the sense of having enough liquid assets on hand, is essential to the successful operation of a business. If you run out of liquid assets, then you can't pay for supplies or wages to your employees. You can't actually do anything to earn the money you need.
- Undoubtedly, you'll have to shut down, at least temporarily, and that may become permanent, especially if you owe money to anyone. If so, you'll have to sell off your business' illiquid assets to raise enough cash to pay off your debts—a process called liquidation.
- You can be technically bankrupt and keep operating just fine, as long as you've got sufficient cash to keep paying your bills and making your bond payments. Companies go out of business when they run out of cash.

THE AMERICAN BANKING SYSTEM

- ⌚ America has a dual-charter banking system, meaning that both the federal government and the individual states award banking charters. The system dates to the Civil War era and the creation of so-called national banks, which were federally chartered. Before that, banks were chartered only by the individual states, with the one exception of the Bank of the United States, which was federally chartered between 1797 and 1811 and then again between 1816 and 1836.
- ⌚ Most banks were allowed to have only a single branch in a single location at the time, so they often had to have correspondent relationships with banks in other cities. A bank in a small town would place a deposit with a larger bank in a larger city that would enable the bank in the small town to make payments through the larger bank and clear checks with other small-town banks that also had correspondent relationships with banks in the larger city.
- ⌚ The banks in the larger city, in turn, would have correspondent relationships with still-larger banks in even larger cities. These correspondent relationships meant that the small-town banks would place deposits with banks in larger towns and cities, and the city banks would place deposits in still-larger banks in yet-larger cities. The smaller banks looked on these correspondent accounts as a store of value, convertible to cash whenever needed.
- ⌚ The federally chartered national banks had the same kind of correspondent system. But instead of being voluntary, they were required by law to hold minimum cash reserves that ended up as deposits at larger and larger banks. Small-town federal banks were required to hold 15% of their deposits in reserves, which could take the form of vault cash. But these reserves could also be held in the form of deposits in so-called reserve city banks.
- ⌚ Forty-seven cities in the United States were designated as reserve cities. And up to 2/3 of a small national bank's reserves could be held as deposits with a national bank in one of the reserve cities.
- ⌚ For a small-town bank, holding an interest-bearing deposit that also enabled it to clear checks in larger cities was very attractive. So, the small-town banks tended to hold the maximum amount of reserves allowed in the reserve city banks.

- ⌚ In turn, the reserve city banks were required to hold 25% of their deposits as reserves. They could hold vault cash or place up to half of their reserves as deposits at national banks in the 3 so-called central reserve cities: New York, Chicago, and Saint Louis. Finally, the large national banks in New York, Chicago, and Saint Louis had to hold 25% of their deposits in cash.
- ⌚ The state and national banking systems both engaged in what economists call the pyramiding of reserves. This means that reserve deposits would flow from the smaller banks in the smaller towns to the larger banks in the larger towns and eventually to the largest banks in the largest cities.
- ⌚ During good times, this system was perfectly fine for everyone, because the money flowed from the periphery of the economy to the urban center, where there were more financial opportunities. The problems came when the flow of money had to reverse, especially in a hurry.
- ⌚ If small-town banks suddenly needed cash, they would send withdrawal requests to their correspondents in the larger towns and reserve cities. And these banks would make withdrawal requests on the largest banks in the central reserve cities.



- ⌚ But if too many banks asked for too much money at the same time, there simply wasn't enough cash to both maintain the city banks' reserves and also distribute the required liquidity to the smaller banks down the chain.
- ⌚ Unfortunately, the rhythms of economic life were such that periodic surges in small-town withdrawals were something of a common occurrence. The small towns tended to be farming communities, so every autumn, the farmers would bring their harvests in to the local grain markets at roughly the same time and expect to be paid in cash.
- ⌚ The simple act of moving cash out from the central reserve city banks to the small-town banks was enough to strain the entire system—and often caused financial panics.
- ⌚ But how could a panic occur when all that was needed was a temporary boost to the amount of money in circulation? With a little extra cash, the New York City banks could ship the required liquidity out to other banks in the chain, and from there to the grain buyers and farmers, who would deposit their earnings in local banks that sent all this cash back upstream again to the central reserve cities, where it wouldn't be needed until next year. But this overlooks one obstacle: the gold standard.

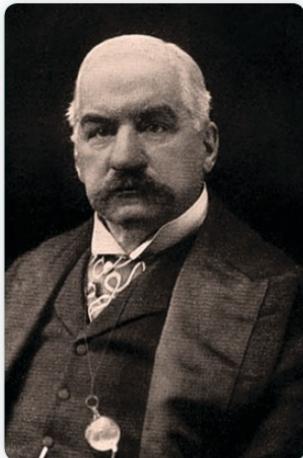
THE GOLD STANDARD

- ⌚ The classical gold standard put the system in a bind that didn't allow any way out—except panic. After the Civil War, the national banks were the source of the nation's currency supply. They were banks of issue, which means that they issued paper currency that was legal tender. But the currency they issued was still backed by gold, which was in the form of coins and bullion.
- ⌚ Thus, national bank notes were freely convertible to gold so that the holders of the national bank notes always had the option to exchange the paper money for gold. This implied that banks couldn't issue too many paper notes, because if they did, the holders of paper money would get nervous and try to convert their paper money into gold coins.
- ⌚ So, the ultimate reserve currency in the system was gold. To maintain confidence in the paper money and ensure that people would hold and use it, paper notes were issued in fixed ratios to the amount of gold held by the bank.

- ⌚ But that also meant that once a bank had issued the maximum amount of paper notes it could, the only way to issue more notes was to obtain more gold. And that was the bottleneck in the system that prevented banks from expanding the money supply whenever the demand for currency surged.
- ⌚ So, banks had no way to expand the money supply once they had created all the paper notes they were allowed to. But the way to maximize the bank's profits was to create all the paper notes they were entitled to. So, their note issues were continually at this limit, leaving no room for quick expansion. This meant that the only way to increase the money supply was for the banks to obtain more gold, from outside the banking system.
- ⌚ Sometimes, this could be done by borrowing gold from wealthy individuals or businesses with stockpiles of gold. The most common method was for the New York banks to borrow gold bullion from London banks or other European investors. And it usually took 15 days for a shipment of gold to cross the Atlantic—an eternity during a financial panic.
- ⌚ Because the money supply couldn't expand quickly—and on demand—the United States currency was inelastic. Everyone knew that America needed a more elastic currency, but people couldn't agree on how to create it. In the meantime, any surge in demand for liquidity was likely to trigger a shortage of currency somewhere in the system, which could quickly become a widespread panic.
- ⌚ Panics spread quickly because once a shortage of currency developed, some bank or business was bound to fail from the lack of liquidity. So, everyone hoarded whatever liquid assets they had and tried to get back any liquid assets that they had loaned out. The more people and businesses tried to hoard liquid assets, the worse the liquidity shortage became, and the more banks and businesses and people failed.
- ⌚ America's inelastic currency, combined with the strong incentive to hoard liquid assets when trouble emerged, created a dangerously fragile financial system that was prone to panics. And just about anything could set them off.

J. P. MORGAN AND THE PANIC OF 1907

- ⌚ The panic of 1907 originated in New York—and not for the last time. By then, the city was already the financial capital of the United States, and many of today's largest American banks were already thriving there. The New York Stock Exchange was also a well-established institution by this time.
- ⌚ New York City banks and the stock market alike played big roles in the panic of 1907. One other type of institution was also instrumental in creating this crisis: trusts, which were originally created to hold and look after assets on behalf of their customers. In short, they were money managers.
- ⌚ Even today, many banks have trust departments that manage money on behalf of their customers. But around the turn of the 19th century, national banks were not allowed to be in this business. So, separate companies called trusts formed. They took customer deposits and made investments on their behalf.
- ⌚ The trusts were more lightly regulated than banks. They held much lower reserves—6% of deposits instead of 25%—and although the trusts were supposed to accept only long-term deposits and make safe, long-term investments in securities, they began to encroach on traditional banking's main business of taking short-term deposits and making loans of various kinds.
- ⌚ Legal loopholes seemed to allow them to increase the risk of their investments and led to promises of high interest rates to attract depositors. Judging by the numbers, it worked. By the pivotal year of 1907, 40% of all deposits in New York were held in trusts.



Historians sometimes portray J. P. Morgan as dealing with the panic of 1907 singlehandedly, but what he really did was coordinate a response to the panic. The one indispensable service he provided was his leadership.

- ⌚ Then, on October 16, 1907, the prices of many copper mining companies collapsed. The news that a number of new copper mines had opened in Alaska led to fears of a copper glut and a fall in the price of copper. This was especially bad news for a group of speculators who had been trying to corner the shares of the United Copper Company on the New York Stock Exchange.
- ⌚ United Copper's shares plummeted, and the speculators lost a huge amount of money. At least 2 of these investors were managers of New York's Mercantile Bank, and they apparently had been using the financial institution's resources in the attempt to corner United Copper, whose loss in share value put the bank in danger of failing.
- ⌚ Fortunately for the bank and its managers, the New York Clearing House—an association of banks—was willing to arrange a private bailout. The clearing house had the ability to coordinate loans from healthy members to financial institutions that got into financial trouble.
- ⌚ But the bailout was conditional on the resignations of the bank managers who had participated in the stock speculation, including a member of the bank's board of directors named Charles Morse. He then made comments that implicated another of his associates, Charles Barney, in the United Copper speculation.



- ⌚ Barney was the president of a New York trust company called the Knickerbocker Trust. And it was a very small leap of logic to conclude that Knickerbocker Trust might be in trouble, just the way that Mercantile Bank was. This news caused a run on Knickerbocker Trust's deposits on October 22.
- ⌚ Trust companies had lower reserves than banks did, and there was no group like the clearing house to come to their rescue. So, even the reasonable chance that Knickerbocker could be in trouble from the collapse in copper shares was sufficient for depositors to line up to withdraw their funds. There were only 2 things that the managers of the Knickerbocker could do: stall for time and appeal for help.
- ⌚ In 1907, the powerful American banker and financier J. P. Morgan not only had at his command the massive resources of his privately held bank, which was named after him, but also considerable expertise, judgement, and force of will. Because of the respect he commanded among fellow financiers, he was able to give orders as if he were the CEO of all the banks of New York.
- ⌚ In response to the run on Knickerbocker Trust, Morgan sent a young banker named Benjamin Strong to Knickerbocker's offices to look over the company's books and make a judgement about its financial condition. If the trust was fundamentally solvent, then Morgan would lend to the company and try to quell the run. But Strong couldn't vouch for the company's solvency. And it was allowed to fail.
- ⌚ This touched off a run on many other trust companies in New York. To withstand the runs, the trust companies started to call in their loans. A huge fraction of these had gone to speculators who used the money to buy stocks and bonds. So, when the trusts called in their loans, the investors had to sell off their assets. In addition, the trusts had loaned money directly to stock brokers and dealers, so the shock was transmitted to the stock and bond markets.
- ⌚ An immediate concern was that the second-largest trust in the country, the Trust Company of America, was now caught up in the panic. Because of its size and prominence, a bankruptcy here had the potential to escalate the crisis to a catastrophic level.

- ⌚ Once again, Morgan sent Strong to look over a troubled institution's books. This time, Strong reported that it was fundamentally solvent. Morgan dispatched \$3 million in cash to the institution, followed by a syndicated loan that took the trust's securities as collateral. This was sufficient to stop the run. But it was just the beginning of a much larger rescue.
- ⌚ On the evening of October 22, the US Secretary of the Treasury contacted Morgan and placed \$25 million at his disposal. The money was a surplus from federal import tariffs that the government hadn't spent. It's exactly the kind of cash injection from outside the banking system that would enable the nation's stock of currency to grow temporarily.
- ⌚ Although this was a lot of money in 1907, it wasn't nearly enough to quell the panic. Within 2 days after the failure of the Knickerbocker Trust, 7 more trusts and banks had failed. And now the panic spread to the stock market.
- ⌚ Many banks and trusts had reacted to the panic by calling in their short-term loans to stock brokers and dealers. These loans were referred to as call money and could be called in at any time. But the sudden loss of call-money funding might mean that the stock brokers and dealers would have to liquidate their shares to raise cash, which would crash the market and still leave the dealers owing money. Faced with this scenario, desperate brokers bid up the call-money rate to 125%.
- ⌚ On the morning of October 24, the president of the New York Stock Exchange informed Morgan that at least 50 brokerages would fail that day if \$25 million weren't made immediately available and that he planned to close the exchange early that day. This was dire news, because the brokerages would fail, possibly causing the panic to spiral out of control.
- ⌚ Morgan told the exchange president not to close even 1 minute early and summoned several other New York bank presidents to a 2 o'clock meeting. Within 15 minutes, the story goes, Morgan had secured pledges for the \$25 million needed to shore up the brokerages.
- ⌚ A team was sent to the exchange floor to announce the availability of call money as low as its normal rate of 10%. Despite the huge cheer that went up, the call-money rate spiked another 25%—all the way to 150%—and Morgan had to raise another \$10 million to prevent a wave of failures.

- ⌚ The panic even drove the city of New York to the verge of bankruptcy, because the European investors who customarily loaned it money now refused to extend any credit during the panic. So, Morgan arranged a \$30 million loan to the city, shouldered by his bank and 2 others. Incidentally, this was the first of 4 bailouts of New York City that J. P. Morgan & Co. would lead during the 20th century.
- ⌚ Morgan knew how to use the resources of the system better than any other banker, but he was still limited by the availability of those resources. A few days later—when the New York Clearing House had trouble clearing payments due to lack of cash in the banks—the best he could do was to persuade clearing house members to use IOUs to clear checks. This would conserve their remaining vault cash until the panic eased. The practice was repeated around the country, as the effects of the panic radiated out from New York.
- ⌚ Panic conditions took a good month to subside. By 1908, things were more or less back to normal. But the recent disruption did have one lasting impact: It succeeded at changing enough minds in finance and politics that America started taking concrete steps to make the currency more elastic.
- ⌚ Congress passed the Aldrich-Vreeland Act, which called for a study of the state of the money system and ways to improve it. It was this comprehensive study that spurred interest in designing a government institution that would create an elastic currency, culminating in the adoption of the Federal Reserve System in 1913.

A contemporary Harvard economist estimated that \$500 million of cash substitutes were put into circulation nationwide as a result of the panic. In all, bank deposits dropped by \$350 million. New York trusts lost almost half of their deposits. Two-thirds of cities with populations of 25,000 people or more had to restrict bank withdrawals or suspend them completely.

Some states had to resort to declaring bank holidays, during which the institutions were required to temporarily close their doors. On average, stock prices fell by 40%. Banks cut back severely on lending, which caused factories in many cities to shut down temporarily.

And all of these things happened at a time when the overall economy was actually fairly healthy.

- ⌚ Notice that we didn't get a central bank, at least not in name. The country still wasn't ready to admit that it needed, or was in fact creating, a central bank. But even though the Fed, as it's widely known today, wasn't named like other central banks, it was given the power to expand and contract the money supply quickly.
- ⌚ This was sufficient to defuse future potential panics caused by an inelastic currency or a fragile banking system. Because of the Fed's creation—and the introduction of deposit insurance and modern bank regulation 2 decades later—liquidity risk went from being a dreaded fear to a problem we had solved (or at least we thought we had).

SUGGESTED READING:

Chernow, *The House of Morgan*.

Lowenstein, *America's Bank*.

QUESTIONS TO CONSIDER:

1. If the Federal Reserve had existed in 1907, what do you think it would have done? Think about specific actions that individual Federal Reserve banks as well as those the whole organization could have taken.
2. In the panic of 1907, one person's efforts were sufficient to stop a financial panic. Are there any people in today's economy who have the personal financial resources or the influence to stop a financial panic? If so, who are they? And would they really have the incentives and ability to act?

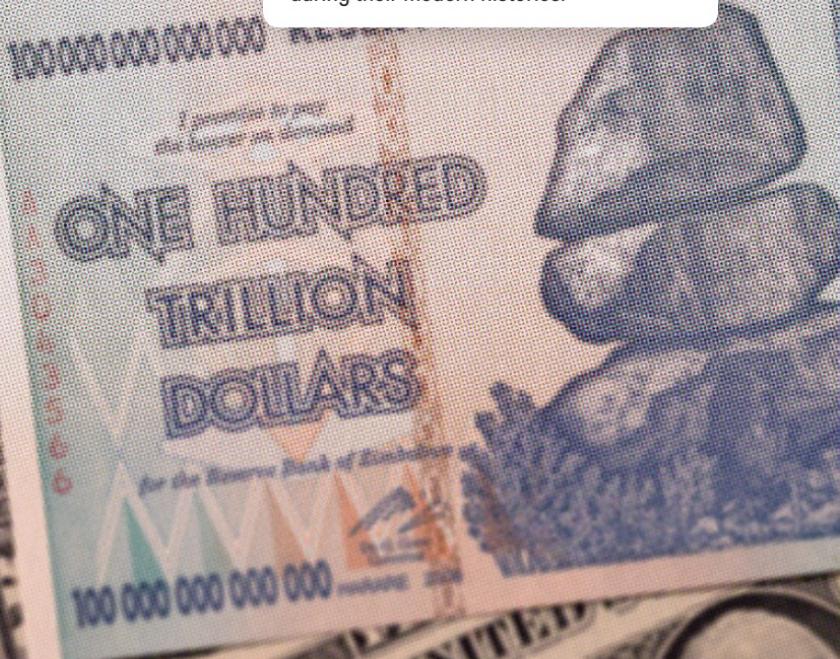
HYPERINFLATION IN GERMANY AND ZIMBABWE

LECTURE 9

There isn't a hard-and-fast definition of hyperinflation, but one offered by economist Phillip Cagan in a pioneering study in the 1950s has stuck with most economists: Hyperinflation is inflation of 50% a month or higher. Hyperinflation destroys wealth on a massive scale. Fortunately, it's fairly rare. But it's important to learn about the causes of hyperinflations so that we can recognize the warning signs. And the circumstances that produce hyperinflation aren't very exotic. In fact, they're alarmingly familiar.

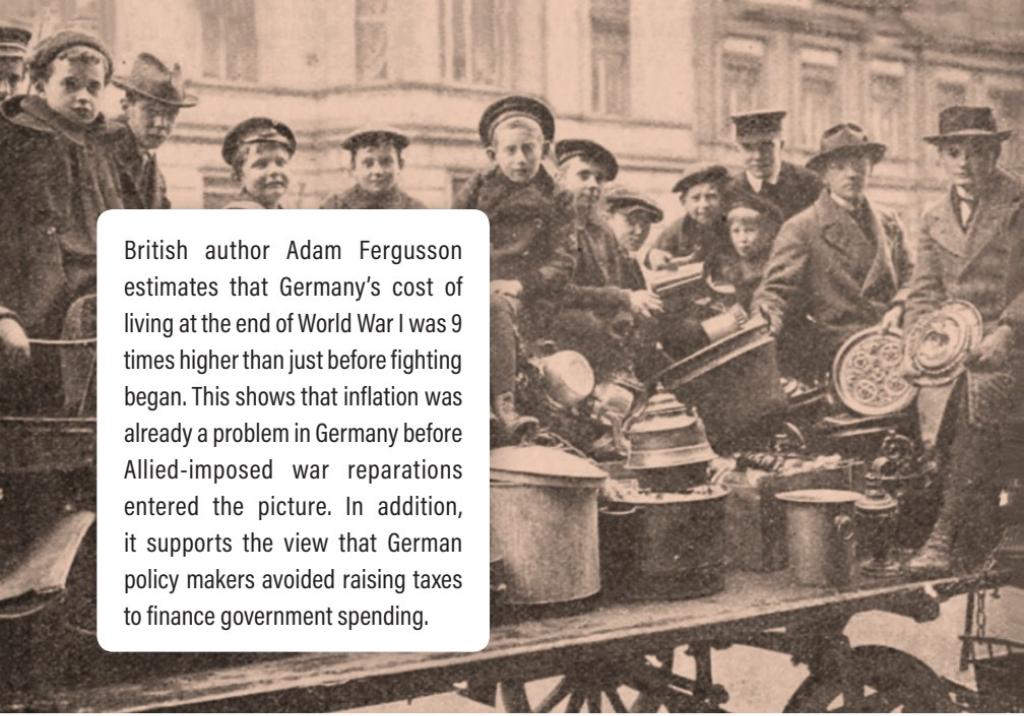
The German-Swiss economist Peter Bernholz estimates that only about 29 periods of hyperinflation have been recorded in the more than 2 centuries since the French Revolution of 1789. Even so, all but one of them has occurred since the start of the 20th century. And many countries have come dangerously close to bouts of hyperinflation during their modern histories.

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HYPERNFLATION IN GERMANY

- ⌚ At the outbreak of World War I in July 1914, nearly every European combatant expected the fighting to be short-lived. And this expectation was partly responsible for how the German government chose to finance the conflict: by borrowing money, rather than raising taxes. In fact, taxes wouldn't be used to pay German war expenses until 1916. And even then, the amount of tax receipts dedicated to the war effort wasn't very much.
- ⌚ In Germany's defense, its federal government at the outbreak of the First World War was a relatively small operation and didn't have the authority to levy income taxes. So, the government relied on excise taxes—on specific products, such as beer—and also on import tariffs. In addition, the government operated the country's railroads, and the railroad profits were an important source of government revenues.
- ⌚ Instead of increasing taxes, the government raised money by issuing war bonds to the public and by floating normal government bonds that it sold to its central bank, the Reichsbank. Up until the war, the Reichsbank operated in a conservative but effective manner. It issued both gold coins and paper money that were accepted as legal tender in general circulation.
- ⌚ Still, the Reichsbank was required to hold a gold reserve equal to a third of all paper notes it issued. So, whenever people wanted to exchange paper money for gold coins, it was no problem for the Reichsbank to do so. And the German currency—known as the mark—acquired an international reputation for soundness.
- ⌚ Once the war began, however, the German government suspended the redemption of paper notes for gold coins and allowed the Reichsbank to count holdings of government bonds as backing for the currency. The Reichsbank would effectively print new currency to pay the government for its bonds.
- ⌚ So, the government's borrowing led to an increase in the money supply. Economists call this monetizing the debt, because money is created to pay for the government's borrowing. Between 1913 and 1917, the German money supply increased by a factor of 5 due to the printing of money to buy government debt.



British author Adam Fergusson estimates that Germany's cost of living at the end of World War I was 9 times higher than just before fighting began. This shows that inflation was already a problem in Germany before Allied-imposed war reparations entered the picture. In addition, it supports the view that German policy makers avoided raising taxes to finance government spending.

- ⌚ The creation of money stimulates aggregate demand, which can help drive economic expansion and growth. But when too much money is added too quickly, this tends to create inflation rather than economic growth. On top of that, wartime economies decrease the production of consumer goods and services and switch to producing military-related material and services. This in itself usually produces inflationary pressures in consumer goods and services, even without an excessive increase in the money supply.
- ⌚ In November 1918, the German monarchy—led by the emperor Wilhelm II—was replaced by a democratically elected government. But this transition changed the country's economic policies very little. Germany's big-business interests still held a huge amount of political clout, and they didn't want higher taxes imposed on their earnings or products. And the Reichsbank still purchased government bonds to back the money supply.
- ⌚ The one thing the country had going for it was that because the war was over, Germany regained access to export markets and shifted production back to consumer goods and services. So, borrowing and printing money kept factories open and employment up.

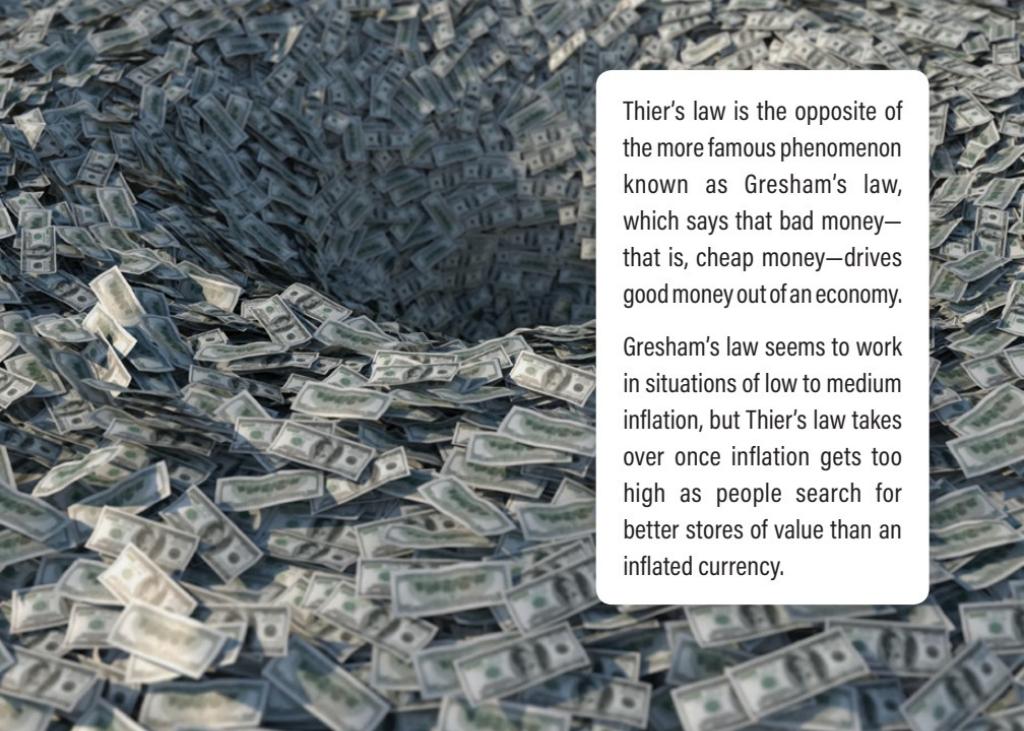
- ⌚ In April 1919, the Allied Powers Reparation Commission demanded that Germany pay the equivalent of 20 billion gold marks by May 1921. And though Germany's obligation to pay for the misery of the Great War didn't directly cause the hyperinflation to come, it made a bad situation worse.
- ⌚ The actual payments were to be in one of the Allies' currencies or in kind, such as transfers of coal or property. But by specifying gold marks, the commission set a standard of value based on the prewar gold standard. So, by the time the bill was presented, the effective price of reparations was actually 1.2 trillion paper marks.
- ⌚ To put this in perspective, German economist Carl-Ludwig Holtfrerich estimates that it would have cost between 11% and 14% of German gross domestic product each year to make reparations payments in full. That's an astounding burden for any economy.
- ⌚ The Germans didn't live up to this obligation, although they did make significant down payments. At the same time, there is historical evidence that the German government used the reparations burden as an excuse to continue its domestic policy of inflationary finance. As prices rose, German people needed more money to pay for basic goods and services, which made it necessary for the central bank to print more money.
- ⌚ The reality was that while Germany was printing lots of money, only part of it was used to buy foreign currency or domestic coal to make reparations payments. Meanwhile, Germany wasn't relying much on imports, either.
- ⌚ The German government's apparent failure to understand the basic relationship between money and prices alternately frustrated and mystified the Allies. But Holtfrerich argues in his book on the German hyperinflation that at least some Reichsbank personnel blamed the government's lack of fiscal discipline for forcing the central bank to print money and touching off the ever-increasing inflation.

A very sharp and deep global recession in 1920 and 1921 affected just about every country except Germany. The Germans avoided it because they were overstimulating the economy with easy money. Inflation rose, but it wasn't hyperinflation yet.

- ⌚ The central bank's internal documents show that at least through mid-1921, the Reichsbank was encouraging the government to raise more money via taxes and to stop forcing the bank to finance the government's expenditures.
- ⌚ The German economy muddled on through a classic upward wage-price spiral until the middle of 1922. Inflation continued to be high and increasing, but Germany hadn't entered into the hyperinflation zone yet.
- ⌚ Then, 2 things happened that changed the course for the worse. One was that the Allied Powers Reparation Commission postponed a plan to make long-term loans to Germany. This was a powerful negative signal because it basically said that the Allies didn't think the German government could pay back any long-term loans. Holtfrerich claims that this realization led to a general loss of confidence on the part of international investors, who rushed to sell German assets and refused to lend any more money to German borrowers.



- ⌚ In turn, this meant that the German government and domestic businesses had only one place left where they could reliably borrow money: the Reichsbank. Private German banks had lost their desire—and perhaps their ability—to make new loans by this time because the high rate of inflation had reduced the value of loan payments the bank would receive in the future. It also caused people to lose interest in keeping cash in the bank in the first place.
- ⌚ Absent a healthy domestic banking system, the government and businesses alike would now offer IOUs to the central bank, which would give them cash loans. For businesses, this was a perfect arrangement, as they would pay back the IOUs 3 months later in vastly depreciated currency. The development was enough to push the domestic inflation rate into the range of hyperinflation—rising above the 50% threshold in August 1922.
- ⌚ A second event indirectly led to the worsening of hyperinflation as a blight on the economy. Walther Rathenau, the minister of reconstruction, had been assassinated in late June 1922, and he was the leading German proponent of paying the war reparations in full. So, his death critically weakened the government's already tenuous commitment to making the reparations payments.
- ⌚ In January 1923, the Allies declared that Germany had voluntarily defaulted on its obligations and authorized its troops to occupy Germany's Ruhr valley, in the country's industrial heartland, to collect reparations in kind from Germany's coal mines, steel factories, and other businesses. In response, the Germans practiced what they called passive resistance: Workers basically went on strike.
- ⌚ At the same time, the government extended loans to companies operating in the Ruhr valley and subsidized wage payments to workers, adding trillions of marks in expenditures to the government budget each month. The money came from the printing press. At the same time, as Germany was losing a significant amount of production, it greatly increased the money supply, which exacerbated the inflationary spiral.
- ⌚ In 1923, we see the outrageous inflation numbers that made the German hyperinflation among the worst in history. The inflation rate peaked at more than 27,000% a month.

A large pile of US dollar bills, showing many \$100 bills, illustrating the concept of "bad money" mentioned in the text.

Thier's law is the opposite of the more famous phenomenon known as Gresham's law, which says that bad money—that is, cheap money—drives good money out of an economy.

Gresham's law seems to work in situations of low to medium inflation, but Thier's law takes over once inflation gets too high as people search for better stores of value than an inflated currency.

- ⌚ A phenomenon known today as Thier's law, a term coined by German-Swiss economist Peter Bernholz, became the catalyst for government action. Thier's law describes the phenomenon by which a good currency will replace a virtually worthless one that no longer fulfills its roles as medium of exchange or store of value.
- ⌚ By the fall of 1923, Thier's law was in full swing. Economic historians show that a huge amount of foreign currencies had started to circulate in Germany as Germans avoided paper marks, if at all possible. The only people who held marks were those who were forced to, including most factory workers. Many employers benefitted from hyperinflation, because they could borrow from the Reichsbank and repay their loans in depreciated marks, so they insisted that their employees accept marks.
- ⌚ But because wages didn't keep up with prices, workers started to pressure companies to pay them with alternate currencies or to index their wages to inflation. Soon, the German government would be the only user of marks. So, it drafted a plan to finally end the years of high inflation.

- ⌚ In November 1923, a new institution called the Rentenbank appeared. The state-owned Rentenbank held 3.2 billion gold marks' worth of mortgages on property and bonds issued by German companies, and it was authorized to issue up to 3/4 of this amount in a new currency called the Rentenmark.
- ⌚ The Rentenmark's value was set equal to 1 gold mark, or 1 trillion paper marks. The worth of the paper mark had fallen to one-trillionth of its prior value over the previous decade due to hyperinflation.
- ⌚ The introduction of the Rentenbank and the Rentenmark was coupled with the end of inflationary finance on the part of the central bank. The Reichsbank stopped buying government bonds. Now the government finally had to find other ways to finance itself.
- ⌚ Still, the Reichsbank and the paper mark didn't go away. In fact, the supply of paper marks continued to increase for another several months. But the introduction of the new currency at the psychologically important value of 1 Rentenmark equal to 1 gold mark restored confidence.
- ⌚ And even though paper marks weren't immediately exchangeable for the new Rentenmarks, the public had faith that they would be able to exchange, for example, a trillion paper marks for a Rentenmark at some future point, so they treated this as the value for the paper marks. And this actually increased near-term demand for paper marks.
- ⌚ This shows the powerful role that confidence plays in establishing market-clearing values. Then as now, maintaining the public's confidence in the value of a national currency is a key job of the world's governments and central banks.

Calculations show that the value of foreign currency in circulation in Germany during 1923 was equivalent to the total amount of German currency before the war began.

HYPERNFLATION IN ZIMBABWE

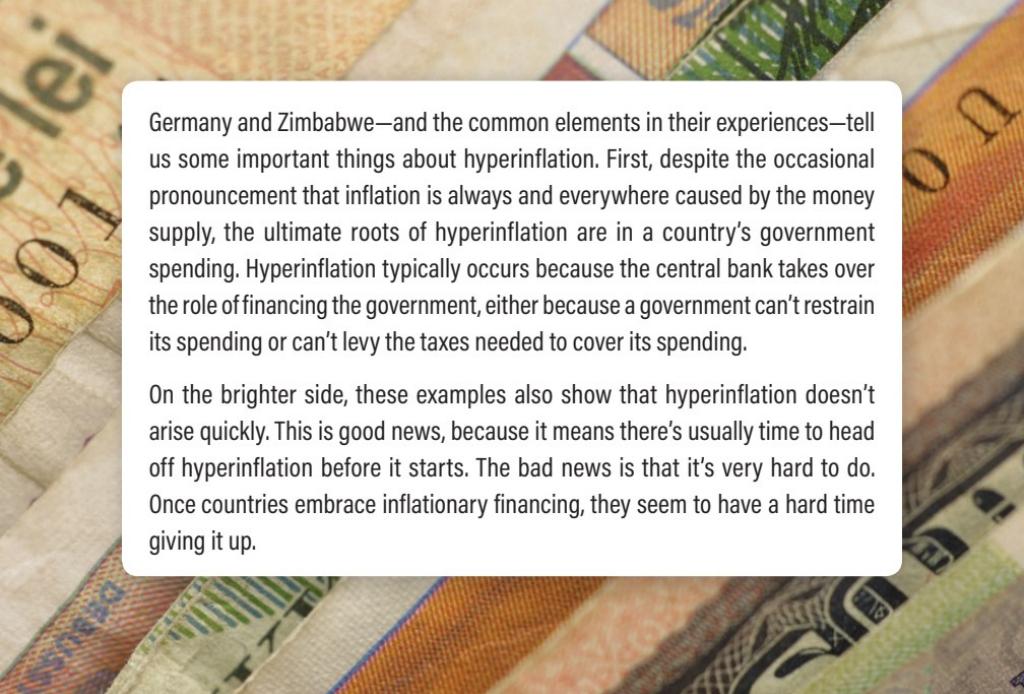
- ⌚ Formerly known as Rhodesia, Zimbabwe became autonomous from Great Britain in 1965, and it became independent under the majority rule of black nationals in 1980. In 1997, the government announced plans to

establish a pension plan for veterans of the independence struggle. The new expenditure increased government spending by more than 50% a year, but tax increases to fund the pensions were abandoned due to violent protests. So, the country's central bank, the Reserve Bank of Zimbabwe, became the pension-funding source.

- ⌚ At the same time, the government embarked on a significant—and economically costly—policy of land reform. Among Zimbabwe's colonial legacies was that most of its best farmland, in a predominantly agricultural economy, was held by a relatively small number of white families. But between 1997 and 2003, virtually all the farmland held by these families was redistributed in the form of smaller parcels to black Zimbabweans. Because the new farms were smaller and many of the people settling these smaller plots had little, if any, experience in managing a farm, Zimbabwe's agricultural output fell during this period.
- ⌚ Predictably, the combination of printing money to finance government expenditures and the loss of productive capacity created a period of high inflation of 50% to 100% a year during this time. The government also interfered with the economy in other ways, such as attempting to stop money from leaving the country and imposing price controls on basic foods.
- ⌚ These policies created black markets for currency and many other products in Zimbabwe and strengthened the informal economy—in which businesses generally don't register with the government and both the business owners and their employees avoid paying taxes. This placed more stress on the government and further stimulated inflationary financing.
- ⌚ The government also implemented several subsidized lending programs, which generally ended up funneling money to the president's political supporters. This practice significantly expanded the credit supply without increasing the country's productive capacity and worsened inflationary pressures.
- ⌚ Then, starting in 2003, the Reserve Bank of Zimbabwe began to engage in what are called quasi-fiscal activities. This means that the central bank directly took over the provision of subsidies and other government spending rather than printing money and lending it to the government first. Quasi-fiscal activities contributed to a jump in inflation, which reached an

annual rate of more than 600% in January 2004 before falling back to the 140% to 160% range.

- ⌚ By 2005, Zimbabwe's informal economy had become the most important source of income for most of the population, even as the government embarked on a program to destroy the market areas and shantytowns that housed much of the activity. Again, the loss of productive capacity combined with monetary expansion worsened the inflation picture.
- ⌚ By mid-2006, inflation reached 1000% a year, and people had to carry large amounts of currency to make even simple transactions. The central bank issued a new Zimbabwe dollar equivalent to 1000 old Zimbabwe dollars while continuing to fund the government with the printing press.
- ⌚ In March 2007, the Reserve Bank of Zimbabwe imposed a 3-month freeze on wages and prices by declaring inflation illegal. By now, the inflation rate for the month of March was 50.54%, meaning that Zimbabwe had crossed over into a state of hyperinflation.
- ⌚ In June 2007, in another ill-advised effort to restore order, the government decreed that all prices must be reduced by half. This created a run that emptied stores and resuscitated the informal economy.
- ⌚ And the government continued to use the Reserve Bank to finance its activities, both directly and indirectly, so inflation continued to rise. By 2008, a 100-billion-dollar Zimbabwean banknote was introduced, and bank withdrawals were limited to 100 billion Zimbabwe dollars a day—which wasn't enough to buy a loaf of bread at the time.
- ⌚ In July 2008, inflation reached 231,000,000% a year. The government was getting ready to issue a 100-trillion-dollar note but never needed to because demand for the currency collapsed.
- ⌚ Thier's law was now in force, and a good currency—the US dollar—replaced the inflated Zimbabwe dollar by the end of the year. The South African rand and other African currencies also circulated. In January 2009, the government capitulated. It declared that the US dollar and the South African rand were legal tender in Zimbabwe, finally ending the hyperinflation. Since then, the US dollar has remained Zimbabwe's main currency.



Germany and Zimbabwe—and the common elements in their experiences—tell us some important things about hyperinflation. First, despite the occasional pronouncement that inflation is always and everywhere caused by the money supply, the ultimate roots of hyperinflation are in a country's government spending. Hyperinflation typically occurs because the central bank takes over the role of financing the government, either because a government can't restrain its spending or can't levy the taxes needed to cover its spending.

On the brighter side, these examples also show that hyperinflation doesn't arise quickly. This is good news, because it means there's usually time to head off hyperinflation before it starts. The bad news is that it's very hard to do. Once countries embrace inflationary financing, they seem to have a hard time giving it up.

SUGGESTED READING:

Bernholz, *Monetary Regimes and Inflation*.

Fergusson, *When Money Dies*.

QUESTIONS TO CONSIDER:

1. Germany's decision to finance their war effort in the First World War through issuing debt, rather than increasing taxes, was a key factor that led to the country's hyperinflation. How did the United States finance its war effort in the Second World War? If it used a lot of debt, why didn't the US experience hyperinflation?
2. One of the interesting contrasts in this lecture is between Gresham's law and Thier's law. At what rates of inflation do you think that Gresham's law is valid in an average economy? At what rate of inflation do you think that Gresham's law gives way to Thier's law?

THE CRASH OF 1929

LECTURE 10

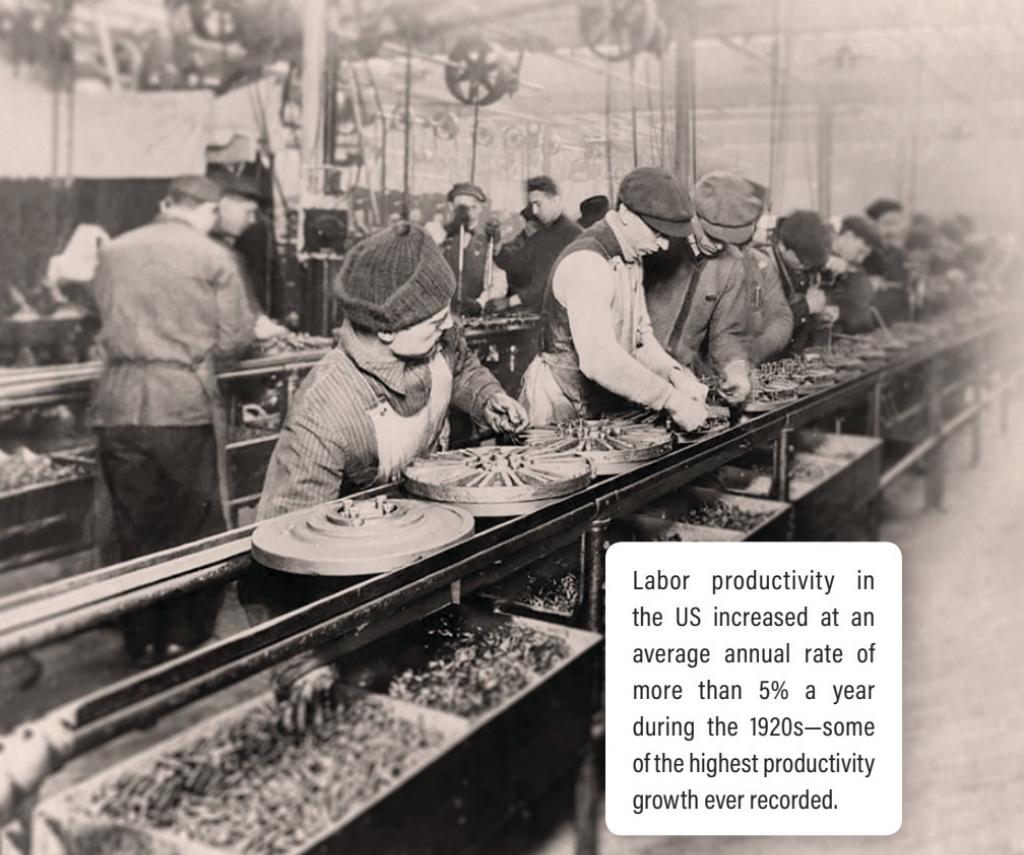
We often refer to the 1920s as the Roaring Twenties, although to many people who lived through the period, it was the “new era.” It was a decade of unprecedented—and, in some ways, unmatched—economic change. Yet Harvard economists Carmen Reinhart and Kenneth Rogoff point out that many of history’s largest market crashes are preceded, if not created, by the belief that this time is different. As asset prices get pushed up beyond historic norms, people tend to think that the established rules of economics and finance just don’t apply anymore. Occasionally, the thinking becomes so widespread that it shapes popular culture, as it did during the 1920s.

- There are 2 basic views of stock valuation.
 1. Fundamentals view: The main drivers of equity prices are profit growth and interest rates. The faster corporate earnings grow, the more shareholders will receive in dividends, and the higher the stock price will rise. On the other hand, higher interest rates make bonds attractive as substitutes for stocks, so the demand for stocks will fall as rates rise. In addition, as interest rates—and inflationary pressures—grow, any stock dividend to be paid to shareholders in the future will have less value today. So, there's a well-established negative, or inverse, relationship between interest rates and stock prices.
 2. Method of comparables: The price of a share should be some multiple of its earnings. For example, a stock might be considered fairly priced if its market price is 10 times its annual earnings per share. This multiple is only a rule of thumb and also depends on the growth rate of the earnings. But if investors expect higher-than-average earnings growth for a company, then its ratio of price to earnings might increase to 11, 12, or even more—to account for the expected future rate of growth. In other words, a higher stock price might be justified today if future earnings are now expected to grow more quickly.
- Both of these stock-valuation methods depend on a calculation of the anticipated growth in corporate earnings.



CHANGES IN THE AMERICAN ECONOMY AND CORPORATE EARNINGS GROWTH

- ⌚ One of the biggest changes occurring in the American economy during the 1920s was the adoption in manufacturing of assembly lines—called Fordism, in honor of Henry Ford—the effect of which was to increase the overall rate of production. Assembly lines spread across the major industries, enabling big increases in quality and efficiency. Simultaneously, the electrification of America was progressing. This enhanced efficiency in numerous ways, one of which was through the use of electric motors in factory equipment.
- ⌚ These advances in efficiency made possible the mass production of automobiles, trucks, and tractors that were more powerful, dependable, and affordable than before. Such capital goods became indispensable to business and farming, in turn further enhancing their efficiency. And as millions of miles of roads were added to America during the 1920s, truck transportation came to rival the railroads.
- ⌚ All of these technical advances of the 1920s boosted profits by dramatically improving efficiency. And this presented a solid reason to bid up the prices of stocks. Another consequence of the increases in technology and efficiency was noninflationary growth. Even as output grew, prices held steady or even fell. In fact, there was actually a slight amount of deflation—a downward pressure on prices—of less than 1% per year measured at the wholesale level.
- ⌚ A low rate of deflation wasn't necessarily bad for the economy, but it did have an impact on stock valuations. First, low inflation meant that interest rates also tended to be lower, and low interest rates are good for stock prices. This created an additional reason for investors to demand stocks. Interest rates were also low due to Federal Reserve policy.
- ⌚ During the 1920s, the Federal Reserve—America's central bank—tried to help Britain and France return to the gold standard, tying the values of their currencies to the price of gold. They had been forced to abandon the gold standard during World War I, when funding the conflict had depleted their gold reserves. To shore up the Allied economies, the Fed sought to make US investments temporarily less attractive to foreigners so that they would sell their US holdings and move the money back home in the form of gold.



Labor productivity in the US increased at an average annual rate of more than 5% a year during the 1920s—some of the highest productivity growth ever recorded.

- ⌚ So, the Fed kept American interest rates low and cut domestic interest rates, primarily because of concerns about gold flows to Britain rather than economic conditions at home. These rate cuts further increased the demand for stocks over bonds.
- ⌚ A second reason why slight deflation in the US was good for stocks was that it discouraged another alternative investment: real estate. Most people have to borrow money to buy a home or speculate on land, and if the price level is falling, a borrower will have to pay back the loan with money that is increasing in value relative to goods, services, and physical assets, such as real estate. This effectively raises the cost of borrowing.
- ⌚ Meanwhile, farm values and the prices of agricultural commodities were also declining. At the end of the First World War, American farmers had

invested heavily to increase output. But they ended up overproducing, causing commodity prices to collapse. This meant that farmland became an unattractive investment during this period.

- ⌚ With low interest rates and deflation reducing the incentive to invest in bonds and real estate, stocks were the best game in town. And they had going for them that efficiency-driven increase in corporate profits. In addition, along with the increase in productivity, the new technologies created entire new industries that captivated consumers and investors alike.
- ⌚ One new industry was commercial radio, and the Radio Corporation of America was a hot tech stock of the 1920s. The decade also saw the rise of the self-service retail chain store, as pioneered by Piggly Wiggly groceries, and retailers like Sears, Roebuck and Company became bellwether stocks. This explosion in retail opportunities was mirrored by banks and other financial intermediaries that started to market securities to individual investors.
- ⌚ Before the 1920s, the main investors in bonds—and especially stocks—had been institutional investors, such as insurance companies and private banks. But during the First World War, the US government successfully marketed its own debt to individual citizens in the form of war bonds. And now, clever bankers realized there was a huge potential market in the rising number of upper-middle-class households with enough money to live on and more left over to save.
- ⌚ National City Bank, today's Citibank, initially sold only bonds to retail investors. It added stocks in 1927, by which time plenty of companies were competing for the business. The number of securities dealers rose from less than 300 at the start of the decade to more than 6000 by 1929.
- ⌚ With that final piece in place, we now had all the ingredients for the bull market of the 1920s: increasing corporate profits; low interest rates; opportunistic new companies; and affluent, motivated customers.
- ⌚ The Dow Jones Industrial Average—an index of 30 New York Stock Exchange-listed companies—doubled, rising from an aggregate price of just below 100 at the end of 1922 to above 200 by the end of 1927. And this is about the time when things got out of hand, judging by the data. The Dow gained another 100 points during the next year, and by early September 1929, it was on track to add another 100 points.

WHAT KEPT STOCK PRICES RISING?

- ⌚ One practice that kept stock prices rising during the 1920s was buying stocks on margin, which means that you borrow money to purchase your shares. Typically, you borrow from your stock broker, who in turn finances these sales by borrowing in the credit markets.
- ⌚ The main lending market available to brokers at the time was the call-money market. A call loan was technically an overnight loan, but the lender could call in the loan at any time: today, tomorrow, or the day after. Most of the time, the main lenders in the call-money market are banks. For much of the 1920s, this was the case.
- ⌚ But as the decade wore on, other lenders jumped in because the market offered very attractive interest rates. In fact, they were so attractive that nonbank companies and foreign investors temporarily became the leading sources of funds in the call-money market.
- ⌚ Nonbank companies would raise money to lend in the call-money market by issuing stock. This made sense because the company would pay a 3% or 4% dividend on the shares they issued and would earn 8% or more lending the money in the call market.
- ⌚ Call-money loans were ultimately backed by the exchange-listed shares that the margin buyers were buying in droves. When a customer purchased shares on margin—that is, when he or she borrowed—the broker would hold those shares as collateral. The idea was that if the price of the stock fell, the broker could always sell the shares to cover the loan.
- ⌚ Before a broker would sell the shares held as collateral, a margin call would be communicated to the borrower, informing that investor that he or she needed to deposit cash with the broker. And it needed to be sufficient to bring the borrower's margin on the now-lower-valued shares back to the initial level. Only when the customer didn't pay promptly would the shares be sold.
- ⌚ Margins varied from borrower to borrower, depending on the investor's wealth, the firm's standards, and the customer relationship. In general, margins varied between 10% for the best customers and 25% for the more marginal ones. Those requirements are much lower than is typical today, and—in retrospect—margin levels in the 1920s were too low.

- ⌚ By one historian's estimate, about 1.3 million Americans, or 1% of the population at the time, became stock investors during the 1920s. And about 600,000 margin accounts were active. While some people might have had several margin accounts with multiple brokers, this is still a remarkable ratio of margin accounts to investors of just over 2 to 1.
- ⌚ Furthermore, the brokerages' cash borrowings nearly doubled—from \$3 billion to \$6 billion—between 1928 and 1929, according to the Federal Reserve. And this might capture only a fraction of total borrowings, as it mostly reflects the credit extended to the firms by the nation's banks. The true amount of brokers' loans in 1929 was probably closer to \$16 billion, after factoring in the nonfinancial corporations and other investors who lent money through the call-money market. This was close to a fifth of the total value of the stock market.
- ⌚ Margin lending looks pretty ethical compared to some other activities that were driving up share prices during this time. The most notorious were groups of investors who formed secretive stock pools that targeted a single stock to drive up its price. Stock pools often included people who were part of the company whose stock was targeted or related to company executives and might have included bankers, financiers, and stock promoters.
- ⌚ These secretive pools combined the worst aspects of stock manipulation and insider trading. Amazingly, they were not against the law, nor did they violate the rules of the stock exchanges at the time. And though they didn't permanently push up any particular share price, the sheer number of pools created the illusion that there was easy money to be made by investing in the right stock at the right time. This helped draw more individual investor money into the market.
- ⌚ A final mechanism that kept stock prices rising during the 1920s was a vehicle known as the investment trust, which issued shares to the public, and the money was invested in shares. If the managers of the trusts had stopped there, there would have been no financial engineering, and the funds would have been a fairly boring product. But these money managers weren't content to raise money by issuing shares; they also borrowed in the credit markets to make leveraged investments.
- ⌚ The investment trusts enabled individual investors to make a double-leveraged bet. The individual investor could buy shares in the investment trust on margin, and the investment trust would borrow under its own

name to buy even more shares. And the borrowing generally didn't even stop there. In many cases, investment trusts bought the shares of holding companies that had themselves borrowed money to buy and hold the stocks of multiple corporations.

- ⌚ Investment trusts issued about \$400 million worth of shares in 1927. In 1928, 186 new investment trusts were formed and collectively sold almost twice the prior year's amount. Some of the best-known banks on Wall Street set up multiple investment trusts that individuals rushed to buy, and the creation of new investment trusts continued into 1929.

OVERVALUATION AND CRASH

- ⌚ The evidence suggests that the market became noticeably, if not significantly, overvalued during 1928 and continued to rise during 1929, all the way up through summer, peaking on September 3rd, when the Dow closed at 381.

- ⌚ Overvalued markets eventually correct themselves, but it's nearly impossible to point to a single event that triggers the correction. What seems to happen, though, is that a growing awareness, or perhaps suspicion, appears in public discussions of the markets.

- ⌚ In 1928 and 1929, the federal government—in the form of the Federal Reserve—was continually and publicly complaining about the excessive amount of speculative buying it believed was taking place in the market.

- ⌚ Roger Babson, an American businessman and financial forecaster, warned that a stock market crash was coming. In September 1929, his claim made it into the newspapers, and this helped spook the markets.



Roger Babson touted his prediction of the crash of 1929 for the rest of his career, which included a run for US president in 1940 as the candidate of the Prohibition Party.

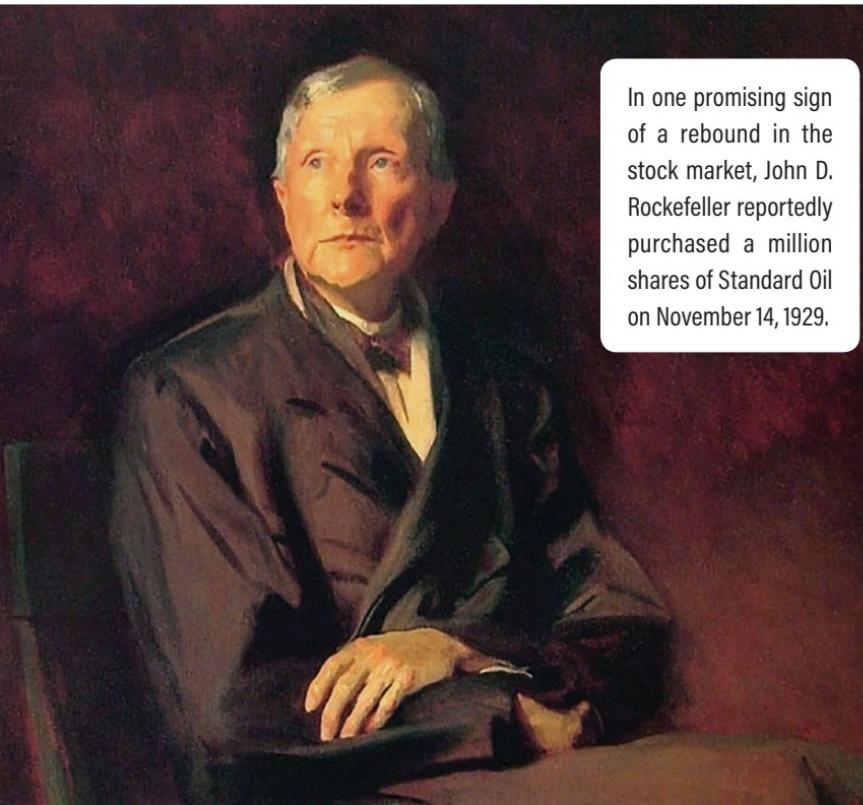
- ⌚ Market corrections—even crashes—are usually spread out over several trading sessions, if not weeks and months. But in 1929, the huge amounts of leverage built up by purchasing stocks on margin, including the use of leveraged investment trusts, almost guaranteed that once prices started to fall, they would drop quickly and by a lot.
- ⌚ Margin buyers needed to sell off as soon as the market started to decline because a relatively small loss to a stock purchased on margin could come close to wiping out the buyer's investment. Plus, most brokers were themselves borrowing money on the call market and then lending the funds to their customers, so if stock prices fell, the brokers would also accumulate big losses. Both margin buyers and their brokers had strong incentives to sell.
- ⌚ The Dow Jones index for September 1929 showed a solid but orderly correction. The index lost value on 14 out of 24 trading days that month, and the losses tended to be much larger than the gains on the winning days. By September 30th, the Dow had fallen from 381 to 343. It fell further to 325 on October 4th, although a surge of buying pushed the index back up above 350 during the following week.

Stock market crash of 1929:

DJIA Stock Index



- ⌚ By the third week of October, large losses were overpowering fewer gains. Many stocks hit air pockets—prices at which there were no willing buyers. The Dow index was sliding toward the 300 level and lost more than 20 points on October 23, which was by far the largest daily loss in more than a year.
- ⌚ On the afternoon of what many now call Black Thursday—October 24, 1929—a coalition of Wall Street bankers led by J. P. Morgan & Co. committed tens of millions of dollars to support the market. They authorized New York Stock Exchange vice president Richard Whitney to buy shares on their behalf. He bought thousands of blue-chip shares at a price that was higher than the current market price. This action calmed the market. The Dow average only lost 6 points for the day, leaving the index value at just below 300.
- ⌚ The Morgan syndicate kept up its market support over the next 2 trading days, Friday and Saturday, but on the following Monday, the syndicate didn't show up. Perhaps the bankers learned from their own sources that the day would bring a new wave of margin-related sell orders, overwhelming their abilities to prop up the market.



In one promising sign of a rebound in the stock market, John D. Rockefeller reportedly purchased a million shares of Standard Oil on November 14, 1929.

- ⌚ The market lost about 20% of its value between Monday, October 28th, and Tuesday the 29th. And then it kept falling. By mid-November, the Dow was trading below 200 for the first time since 1927. Initially, that seemed to signal that stocks had lost enough ground, because the market began a 5-month rebound.
- ⌚ By the following April, the Dow was back up to 294—at least briefly. But the recovery was short-lived. Between April and October 1930, the Dow slid back down to 200 and kept falling. By November 1931, it was trading below the 100 level.
- ⌚ What was taking place, by then, was more than the deflation of a stock bubble. As we better understand in hindsight, America and the world were at the doorstep of a global depression that would last for a full decade—from October 1929 until 1939 and the outset of World War II.

SUGGESTED READING:

Klein, *Rainbow's End*.

Klingaman, *1929*.

QUESTIONS TO CONSIDER:

1. How much do you think that stock price manipulation played a role in the crash of 1929? Did stock manipulation play a role in later market crashes? If so, which crash do you think was significantly affected by manipulation, and why? If not, why not?
2. One of the indicators of overvaluation is the cyclically adjusted price-earnings ratio (CAPE). What was the value of the CAPE right before the crash of 1929? What value of the CAPE do you think indicates overvaluation? What value of the CAPE indicates that a crash or market correction is imminent?

THE GREAT CONTRACTION OF 1931-1933

LECTURE 11

Between 1931 and early 1933, a third of all banks in the United States failed, culminating in President Franklin Roosevelt's declaration of a 4-day national bank holiday, in which all bank transactions were involuntarily suspended. The nation's stock exchanges also closed. This was the peak moment in a financial earthquake that economists Milton Friedman and Anna Schwartz called the Great Contraction—which probably didn't cause the Great Depression, but the wave of bank failures driving it was one of the leading contributors to the Depression's depth and length. Meanwhile, a parallel crisis was taking place in a different financial institution known as a building and loan association; this early meltdown in the nation's mortgage markets helped make the Depression significantly worse.



There are a few things to keep in mind about this period in US history.

- Banking regulations were much different than they are today. Some were actually much more restrictive. The limits on banks in effect back then meant that the banks tended to be small and undiversified. Loans were made to whatever businesses were in town; therefore, bank fortunes rose and fell directly with the local economy. On the other hand, some financial regulations were much more relaxed, or nonexistent. Some bank owners defied the restrictions on branch banking by purchasing or investing in many individual banks. This practice played an important role in the Great Contraction.
- Federal deposit insurance was nonexistent. The Federal Deposit Insurance Corporation (FDIC) wasn't created until 1933. The lack of deposit insurance meant that depositors could lose their life savings if their bank failed. Therefore, they had a huge incentive to withdraw their deposits if they received news, or even rumors, suggesting that the local bank was in trouble. In turn, this meant that bank runs were a common occurrence, often spreading to other banks, towns, and even states.

THE GREAT CONTRACTION

- ⌚ The average number of bank failures rose from fewer than 200 a year before 1920 to more than 500 a year during the 1920s. The vast majority consisted of small single-branch banks in rural areas. The increased rate of failures at the time wasn't a banking panic by any measure, but many of the lenders were barely making ends meet and weren't financially strong enough to withstand an economic downturn.
- ⌚ The United States experienced an economic downturn of historic proportions starting in 1929. The economy reached its peak in about August of that year and then began a sharp contraction, driven by a fall in the demand for automobiles and other big-ticket consumer durables. The decline in economic activity led to layoffs, lower consumer spending, and defaults on mortgages and other loans. Overextended banks suddenly found themselves vulnerable.

- ⌚ This kicked off a series of regional banking panics in late 1930. Even though these banking failures were concentrated in a few states, they had an important effect on the entire nation. When people become nervous about the soundness of their banks, they begin to hoard currency—they hold less of their savings in the form of bank deposits and more of it in cash.
- ⌚ Economists can measure the distrust of the banking system by tracking the shares of the money supply that are made up by currency and by bank deposits. The idea is that the less trust people have in banks, the more they hold their savings in currency—cash—rather than bank deposits.
- ⌚ And if there is a big loss in confidence in the banks, people will withdraw their bank deposits and hoard cash. Historians use these statistics to argue that the stock market crash of 1929 didn't have much to do with the subsequent waves of bank failures.
- ⌚ In fact, the total amount of currency in circulation actually fell during the 12 months after the crash of 1929. And there was no evidence from the monetary statistics of an increase in the public's demand for currency relative to bank deposits. This implies that people didn't lose confidence in their local banks during this time. Because the New York Fed quickly made emergency loans to local banks after the crash, almost no bank failures resulted from it.
- ⌚ On the other hand, national monetary statistics show that the fraction of the money supply held in the form of cash increased during the regional panics of 1930 and 1931. This suggests a heightened distrust of the banks that remained even after the wave of panics subsided.
- ⌚ Cash became harder for banks to come by. So, if a shortage of cash was the main problem, why didn't the Federal Reserve simply pump more cash into the banking system to prevent failures? This key question is only partially answered by the fact that many, if not most, of the failures occurred among banks that weren't members of the Federal Reserve System.
- ⌚ The Fed still could have loaned cash to member banks, in the hope that the member banks would lend it to other banks outside the Federal Reserve System, but this didn't take place—at least not in the districts most affected by panics, such as Saint Louis and Chicago.

- ⌚ A larger problem was that bank panics spread easily from weak institutions to healthy ones. Economists Milton Friedman and Anna Schwartz argued that most of the presidents of the regional Federal Reserve banks didn't have a very good understanding of this process because they didn't have much experience in dealing with bank panics.
- ⌚ Previously, bank panics had generally originated in New York and spread throughout the rest of the country from there. But during the 1930s, nearly all the panics originated outside of New York. The Federal Reserve Bank of New York was the only regional Fed bank with much expertise in dealing with this problem, and it knew the importance of injecting liquidity into the local banking market to protect runs. But the president of the New York Fed, George L. Harrison, simply couldn't convince the other Fed presidents of this.



According to economists Milton Friedman and Anna Schwartz, the Great Contraction was likely "the most severe business cycle contraction" in US history up to that point.

- ⌚ When a new shock hit the banking system in September 1931, the rate of failures and panics accelerated and spread to new parts of the country. This time, the shock came from outside the United States: Britain announced that it was abandoning the gold standard. This affected American banks for 2 main reasons.
 1. Many Americans concluded that Britain's move meant that the US would also abandon the gold standard, so they rushed to withdraw their deposits—in the form of gold coins, if possible—which worsened the growing problem of currency hoarding.
 2. Foreign investors also cashed out, leading to a huge outflow of gold from US banks and the Federal Reserve to foreign destinations. The problem with gold flowing out of US banks was that the Federal Reserve was required to back a minimum proportion of the currency in gold. When too much gold left America, the Fed was obligated to raise interest rates to entice investors—both foreign and domestic—to buy American bonds with their gold. But raising interest rates during a recession pushes more borrowers into default and more banks into distress.
- ⌚ Between the additional drain on bank liquidity and the increase in interest rates in response to Britain's abandonment of the gold standard, 522 banks failed in October of 1931.
- ⌚ By this point, the banking crisis was regarded as a national problem, and there were calls for the government to do something about them. Congress started to discuss the possibility of creating government agencies to extend credit to businesses and households. That placed pressure on the Fed to act, and in April of 1932, the Fed began to buy government bonds on a large scale.
- ⌚ This helped the banking system, because no matter who the Fed purchases a bond from, eventually the proceeds from this purchase were likely to end up deposited in some bank. These bond purchases were the liquidity support that the banks had been needing since late 1930, and they seemed to help reduce bank failures and stimulate the overall economy.
- ⌚ But the Fed's primary motivation for making the purchases seemed to be political rather than economic. According to Friedman and Schwarz, the Fed stopped buying government bonds as soon as Congress went on its summer recess.
- ⌚ Congress also took action in 1932, in the form of funding a new government-sponsored corporation called the Reconstruction Finance Corporation (RFC),

which was authorized to borrow money from the Treasury and lend it to banks that were solvent but illiquid. Unlike the Fed, the RFC was authorized to lend to any bank.

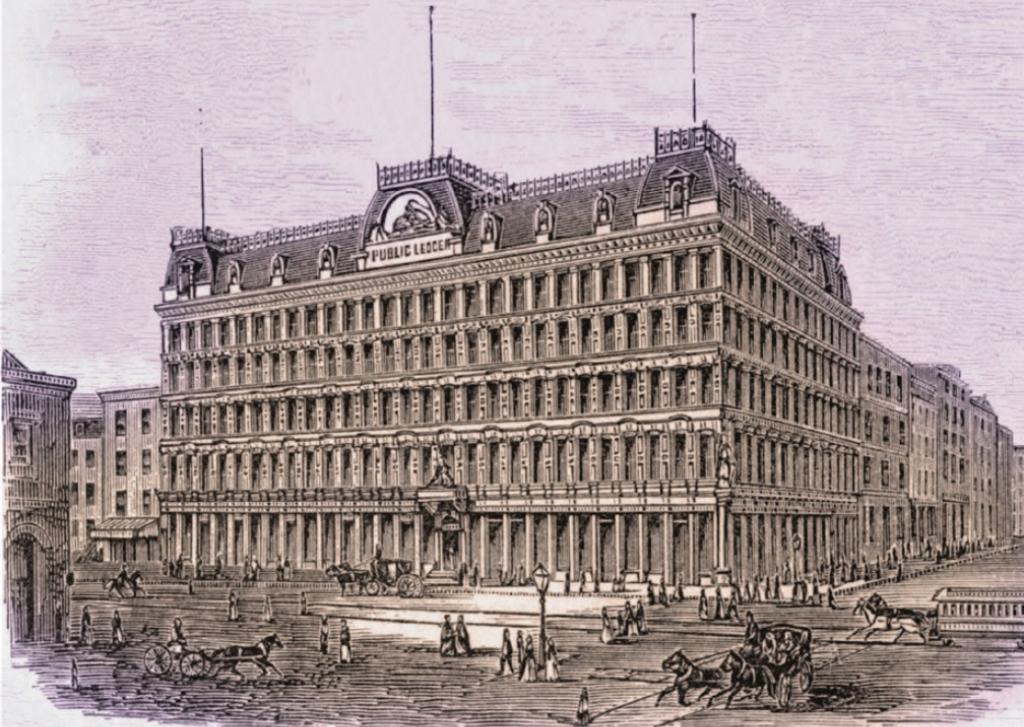
- ⌚ This might seem like a great solution to the problem, but although the RFC did start lending to banks, it didn't live up to its potential. It was too conservative in its evaluation of bank finances and often insisted that private investors also make loans alongside the RFC.
- ⌚ These are actually pretty good policies to have in place—unless a severe banking crisis is already underway. The problem is that they can prevent the sort of fast and dramatic actions that are necessary during a crisis situation.
- ⌚ Soon enough, Congress inadvertently turned the RFC into a tool that stoked additional bank panics. In early 1933, it passed a law requiring the RFC to publish the name of any bank that received loans from it, including those who borrowed during the previous year.
- ⌚ If a bank's name appeared on the list, people inferred that the bank was weak or in trouble, and this caused fresh bank runs. Ironically, Congress's policy might have ended up destroying many of the same banks that RFC lending had saved just a few months before.
- ⌚ To make matters worse, there was a huge amount of confusion over whether the Fed or the RFC should be the lender to any particular bank. President Herbert Hoover didn't help the situation by naming the recently appointed chairman of the Fed, Eugene Meyer, to also serve as the head of the newly created RFC. Meyer had already demonstrated in his position at the Fed that he wasn't that enthusiastic about supplying more liquidity to the banking system.
- ⌚ Eventually, state and local authorities felt compelled to take matters into their own hands. Economic historian Elmus Wicker says this precipitated what became a truly nationwide banking crisis in early 1933.
- ⌚ It was touched off in Detroit, where banks were already suffering from a sharp downturn in the automobile industry. Most of the banks in the city belonged to one of 2 banking groups that were connected to each other through holding companies. One of them, the Guardian Detroit Union Group, owned 23 banks and trust companies and included the Ford family among its major shareholders.

- ⌚ On the verge of bankruptcy, it started negotiations with the RFC for funding. But as usual, the RFC insisted that private investors contribute. In this case, it was the Ford family, which already had millions of dollars deposited in Guardian Detroit Union's banks. The RFC demanded that the Fords agree to take losses on their deposits if the bank eventually failed. The Fords refused, despite personal pleas from President Hoover.
- ⌚ When it became clear that the rescue would fail—and the Guardian Detroit Union Company with it—Michigan's governor declared a statewide bank holiday on February 14, 1933. This meant that certain banking restrictions were temporarily put in place to conserve cash so that the banks wouldn't have to go out of business. The policy bought time for the banks and the government to hopefully sort things out.
- ⌚ But there's one big problem with declaring a bank holiday in your city or state: It can spread panic to neighboring areas and cause them to have to declare a bank holiday, too. Large depositors, such as major corporations, generally have multiple accounts spread across the states that they do business in. If Michigan declares a bank holiday, this shifts the liquidity pressure onto the banks in neighboring states, exposing them to bank runs. You might have to declare a bank holiday simply as a defensive move to ensure the survival of your own state's banks.
- ⌚ And that's a pretty good explanation for what happened. By the end of February 1933, 18 states had imposed holidays, or other types of restrictions, on withdrawals. And many state governors that authorized the actions explicitly stated that they were doing so to protect their banks.
- ⌚ During the first few days of March, the bank holidays continued to spread to several more states a day so that by inauguration day on March 4, 1933, virtually every state in the union had some restriction in place on bank withdrawals. Looked at this way, when the newly sworn in Franklin Roosevelt declared a national bank holiday on March 6, he was essentially validating—and standardizing—the bank holidays that were already in place nationwide.
- ⌚ Banks throughout the country remained closed while regulators tried to determine which ones were sound enough to reopen. Almost 3400 banks would remain shut permanently, and many other types of financial institutions, such as private mortgage insurance companies, permanently closed as well.

THE BUILDING AND LOAN ASSOCIATION

As devastating as the Great Contraction was for the banks, another type of financial institution fared even worse: the building and loan association, which consisted of taking household deposits and making mortgage loans and is akin to the more contemporary savings and loan association. Building and loans increased in popularity during the latter part of the 19th century, and by the end of the 1920s, they were the largest source of mortgage funding in the United States.

The first true building and loan association, according to H. Morton Bodfish's history of this institution, was the Oxford Provident Building Association of Pennsylvania, which originated in 1831.



- ⌚ Building and loans weren't considered to be banks; they were organized under general business charters rather than banking licenses. This had to do with the terms of their deposit and loan contracts. Instead of offering standard deposit accounts, building and loans sold people shares in the company. Money from the sale of shares was then loaned out as mortgages.
- ⌚ When a household took out a mortgage, it committed to buy a certain dollar amount of shares in the building and loan each month. When the value of the shares purchased by the household equaled the mortgage principal, the household redeemed the shares all at once, and this would cancel the mortgage debt.
- ⌚ Households paid interest on their mortgage loans, and the profits earned by the building and loan were paid out to all the holders of shares in the form of dividends. In addition, just like the shares in any company, the shares of the building and loan would increase in value as long as the building and loan earned good profits.
- ⌚ During good economic times—when people repaid their mortgages without trouble—a borrower really benefitted from the arrangement. As the borrower bought the shares that would eventually pay off his or her debt, the shares earned dividends and also increased in value. And this effectively shortened the maturity of the mortgage. But this arrangement was also an Achilles' heel.
- ⌚ During economic downturns, the arrangement turned from a virtuous circle into a vicious one. As the economy turned down, more people had trouble paying their mortgages, so the building and loan's profits fell, dividends fell, and it took borrowers longer to pay back their mortgages. If enough people defaulted, the value of the shares of the building and loan itself declined in value. That gave other borrowers an incentive to default on their loans as well.
- ⌚ Unfortunately, situations like this played out over and over during the early 1930s. There were about 12,000 building and loan associations in the United States in 1929, and more than a third of them failed during the Great Contraction. The building and loans failed by becoming frozen, which meant that they couldn't redeem any shares until they liquidated the properties that they had foreclosed. In some cases, it took more than a decade for failed building and loans to fully liquidate their assets.

Within a year after the Great Contraction, some of the most significant banking and financial legislation in history was passed, including the Banking Act of 1933 and the Home Owners Loan Act of 1933. Through this type of legislation, the federal government became the major player in the regulation of the banking system in the United States, and this brought a new—if impermanent—era of stability.



SUGGESTED READING:

Friedman and Schwartz, *A Monetary History of the United States*, chap. 7.
Wicker, *The Banking Panics of the Great Depression*.

QUESTIONS TO CONSIDER:

1. If you were the governor of a US state today, do you think that declaring a bank holiday would be an effective way to protect your state's banks? Why or why not? What differences between the banking system of the 1930s and today's banking system account for your answer?
2. One of the conclusions of this lecture is that the government did not waste a good crisis: Several pieces of landmark financial legislation were written in response to the banking problems of the Great Contraction. Did the US waste a good crisis in the 2008–2009 financial crisis? What evidence supports your conclusion?

THE SAVINGS AND LOAN CRISIS

LECTURE 12

Sometimes known as thrifts, savings and loan associations operated like banks in that they took savings deposits and made loans, but they were focused on households. They took deposits only from individuals and concentrated on mortgage lending. Savings and loans were popular because they offered slightly higher deposit rates than the banks, which, in any event, preferred to lend to businesses. In addition, most savings and loans were small, local institutions, and nearly all were owned by their depositors; they knew their customers and could cut them some slack if their mortgage payment was late. Not surprisingly, savings and loans became the main mortgage-lending institution in the US economy.

THE SAVINGS AND LOAN ASSOCIATION

- ⌚ After the Federal Home Loan Bank Act of 1932 created the modern savings and loan, only about 140 institutions failed in the first 45 years—an average of less than 4 a year, which implies a failure rate of less than 0.1% a year.
- ⌚ But the picture started to change during the 1960s and 1970s, when inflation took off. As inflation rose, so did interest rates. Rising interest rates were bad news for all financial intermediaries, and especially for savings and loans.
- ⌚ The first problem was that federal regulations capped the rates that banks and savings and loans could legally pay on their deposits. When market interest rates rose above the deposit rate ceilings, households would pull their deposits from the savings and loans and put them in higher-yielding instruments—particularly in increasingly popular money market mutual funds.
- ⌚ Savings and loans had to do something to hold onto their deposits to keep the asset and liability sides of their business in balance. It would have been virtually impossible to fund long-term loans—such as 30-year mortgages—with deposits subject to short-term ebbs and flows. So, they started to give incentives to their depositors in the form of expensive home accessories, such as wall clocks, cigarette lighters, and stainless steel flatware.
- ⌚ Giving away prizes was a way to get around the interest rate ceiling by paying interest in kind, in the form of goods. And it worked fine, until interest rates really started to spike in the late 1970s and early 1980s. At that point, savings and loans had growing difficulty competing, and many in the business feared that the industry was headed to extinction.

The savings and loan association—with its federally insured deposits—was created in the early 1930s to help resuscitate the mortgage market during the Great Depression.

By the end of the 1970s, it was a common joke that the place to get a new toaster was your local savings and loan—or bank. One thrift in Beverly Hills, California, raffled off a new car, a mink stole, and a color TV.

- ⌚ But some savings and loans had lobbied Congress and their federal regulator, the Federal Home Loan Bank Board, to allow them to offer more competitive interest rates. And in 1978, savings and loans were allowed to offer new deposit accounts that paid much higher rates of return. These were still not quite as high as people could get from a money market fund, but it was enough to avoid a massive flight of deposits.
- ⌚ This partial deregulation, however, created a new problem. The savings and loans' effort to attract new deposits—and retain existing ones—meant that their interest expenses increased a lot, even as their interest income essentially held steady. This happened because the savings and loans' assets consisted of mortgages that they had made during the past 30 years, when interest rates had been lower.
- ⌚ And the interest rates on these mortgages were all fixed. For example, a savings and loan that made a mortgage loan in 1966—at an interest rate of 6%—would receive payments fixed at this interest rate until 1996, when the mortgage was finally paid off.
- ⌚ More-recent mortgages would earn greater interest, reflecting higher contemporary rates, but new mortgages accounted for a small share of the total mortgages held on a savings and loan's balance sheet. In those days, borrower and lender both typically held the same mortgage from origination to maturity, decades later.
- ⌚ Depositors had much greater flexibility to withdraw their savings and reinvest at any time. This led to a significant migration from lower-yielding to new, higher-yielding deposit accounts. And it meant that the typical institution's interest payments increased significantly.
- ⌚ As a result, the difference between the interest that savings and loans earned from their mortgages and what they paid out on deposits declined dramatically, and even turned negative. This spread, or net interest margin, dramatically shrunk the industry's profitability.
- ⌚ Many savings and loans started to lose money. In 1980, a third of the approximately 4000 savings and loans in the United States at the time reported losses. By the end of 1981, about 85% of all savings and loans were losing money. Clearly, that was unsustainable.

- ⌚ But if the problem was that the savings and loans weren't earning enough interest on their mortgages, why weren't they using adjustable-rate mortgages, whose interest rates would rise along with the market interest rate?
- ⌚ The short answer is that savings and loans didn't have permission to offer adjustable-rate mortgages. And even though they did receive permission beginning in 1980, it was too late. Even if all the new mortgages issued by savings and loans took the form of adjustable-rate mortgages, the overwhelming majority of savings and loan assets were tied up in earlier fixed-rate mortgages made at low interest rates up to 30 years ago. There was just no way to increase the interest income from mortgages quickly enough.



ACTS OF CONGRESS

- ⌚ Congress and federal regulators were well aware of these problems, which to a lesser extent also affected banks. So, they took significant action in the form of the Depository Institutions Deregulation and Monetary Control Act of 1980, which marks the start of large-scale banking deregulation in the United States. It phased out the interest rate ceilings on deposits, allowed adjustable-rate mortgages, and allowed savings and loans to expand into other lines of business.
- ⌚ In particular, it allowed savings and loans to invest up to 20% of their assets in consumer loans and commercial paper. This was a positive step for the savings and loans, but it still wasn't enough to stop the problems; they continued to lose money, and it looked like the industry was heading into crisis.
- ⌚ In 1981, 34 savings and loans failed, more than doubling to 73 failures in 1982. That trend was disturbing, especially given that the industry's regulatory insurance fund, the Federal Savings and Loan Insurance Corporation (FSLIC)—the savings and loan equivalent of banking's Federal Deposit Insurance Corporation (FDIC)—didn't have very much money. It was rapidly becoming clear that FSLIC was barely solvent, if that.
- ⌚ Given the grim picture, Congress responded in the form of the Garn-St. Germain Depository Institutions Act of 1982, named after the banking committee chairs in the Senate and House. This law took a 2-pronged approach that was even more significant for the ultimate fate of savings and loans than the previous law passed in 1980.
 1. The first prong was to double down on deregulation. The thought was that the savings and loans weren't being allowed to move quickly enough into higher-yielding areas of lending, so the act increased their allowable upper limit on consumer lending and authorized them to devote up to 40% of their loan portfolios to commercial real estate. The act also allowed savings and loans to invest in junk bonds, or non-investment-grade debt issued by low-rated companies. This form of debt pays higher interest rates and is often referred to as high-yield debt but also has a much higher default risk.

2. The second prong was a policy of systematic regulatory forbearance, which describes a practice of not enforcing the existing rules very strictly, and even loosening them in some cases.

- ⌚ Regulators had already loosened the accounting rules for savings and loans in 1980 in ways that reduced reported expenses and increased reported income to help savings and loans look financially stronger and avoid being declared insolvent.
- ⌚ The act also created a financial instrument called a certificate of net worth, which would be given to a savings and loan that was technically bankrupt to miraculously deem it solvent again. The certificate was backed up by an IOU from the nearly insolvent FSLIC.
- ⌚ Regulators started to pressure healthier savings and loans to merge with failing savings and loans and gave them an incentive to do so by allowing the creation of goodwill assets, which essentially consisted of inflated loan values and unrealized losses. In essence, because FSLIC knew that it didn't have the money to resolve all the failing savings and loans, regulators were trying to give the industry time to earn its way out of trouble by tethering weak institutions to strong ones.

"Goodwill" is an accounting term that describes any excess between what one company pays for another and what the acquired company's accounting statements say that the company is worth.

Goodwill assets were used to facilitate hundreds of mergers of bankrupt savings and loans with healthier savings and loans during the 1980s.

- ⌚ Then, the industry took a serious turn for the worse, especially in Texas and California. Driven in part by a nearly 40% decline in oil prices between 1981 and 1985 and a tumble of 50% more in the first half of 1986, hundreds of savings and loans became technically insolvent. Worse, the sizes of the losses were much larger than they had been a few years earlier. What was going on?

- ⑤ In short, all of the risky activities that many savings and loans had moved into—thanks to changes in the regulations—were catching up with them. Many savings and loans had expanded enthusiastically into new lines of business, especially in commercial real estate lending.
- ⑥ In addition, spikes in oil prices during the 1970s created an economic boom in Texas, Oklahoma, and other oil-producing states. The boom fed a construction binge that the savings and loans used their newly acquired lending ability to jump into.
- ⑦ At the same time, Congress had passed tax-reform legislation in 1981 that accelerated depreciation-related write-offs for all kinds of capital investments, especially commercial buildings. For savings and loans that were willing to expand into commercial real estate, this seemed like a fantastic opportunity. It also helps explain why many new savings and loans started up during this time. Why open a bank when the rules governing savings and loans were much more lenient?



President Reagan signs the bill, 1981

- ⌚ Fast growth in lending is a surefire sign of trouble to come. When lenders compete for business, they tend to lower their lending standards and focus on getting as many customers through the door as possible. They often assume that a strong economy or market will make up for their mistakes, but reality has a way of catching up eventually. And it caught up in a particularly heavy-handed way for the savings and loan industry.
- ⌚ First, there were the direct consequences of bad lending decisions: increased loan defaults. Then, oil went from being expensive and in short supply to a glut; the price of a barrel plunged from nearly \$40 a barrel at its peak in 1980 to below \$10 in 1986. And that same year, Congress passed another tax bill that took away the overly generous tax breaks for commercial real estate investment that it had put in place just 5 years earlier.

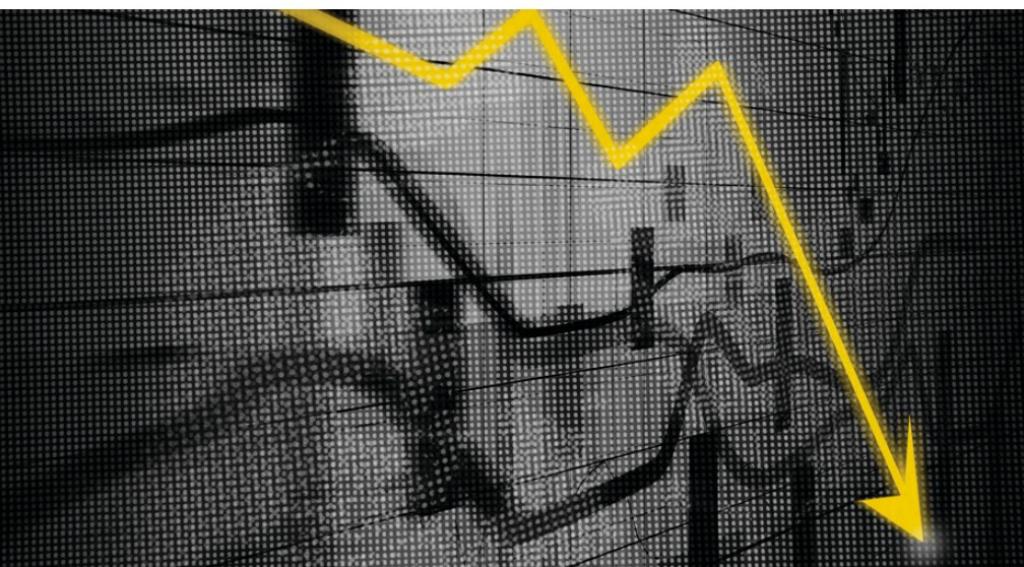
FALLING INTEREST RATES AND FINANCIAL CRIMES

- ⌚ Another development was that interest rates were falling back to normal levels. Remember, the ultimate source of financial stress for the savings and loans was the big increase in interest rates that had taken place in the late 1970s. Many savings and loans that stuck to their traditional business of taking deposits and making mortgage loans during the 1980s—and there were hundreds of them—were restored to health by the end of the decade.
- ⌚ In general, the savings and loan failures of the mid-to-late 1980s were concentrated among the institutions that took the biggest advantage of the new ability to lend to nontraditional borrowers. The standard interpretation of this is that many savings and loan operators expanded into business areas they were unfamiliar with and therefore made more mistakes than banks and other lenders with much more experience in these areas.
- ⌚ The managers of these higher-risk savings and loans also knew that if they ended up failing, depositors were insured up to the federal limit of \$100,000 at the time. Many academics emphasize the moral hazard problem of deposit insurance: If the average American didn't get hurt, who would argue against the higher risks?

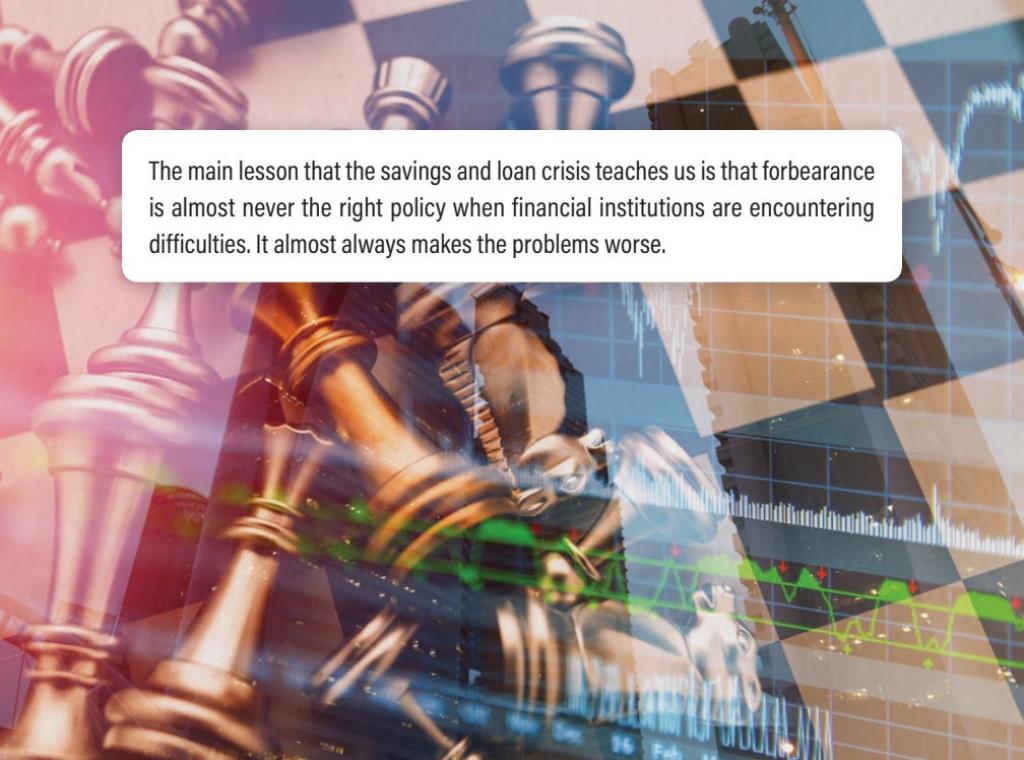
- ⌚ But while lender inexperience and moral hazard played important roles in the savings and loan crisis of the 1980s, the former federal regulator William Black argues that this account of the crisis vastly underplays the role of control fraud, which is deception practiced by the people who run a corporation, including the managers and directors.
- ⌚ Because they control the day-to-day operations—including the information shared about the company’s activities—these people are in a position to deceive the public in order to enrich themselves. Black argues that control fraud was an important factor in the failure of many of the fastest-growing savings and loans.
- ⌚ More than 1000 savings and loan insiders—managers and directors—were prosecuted for financial crimes related to industry failures. Fake profits led to big bonuses for the managers and owners, who took the money even though this further weakened the federally insured institutions they oversaw.

THE HEIGHT OF THE CRISIS

- ⌚ The industry forbearance problem took even worse forms during the height of the crisis. Because FSLIC didn’t have enough resources to handle the savings and loans that already had failed—let alone any new ones—by the end of 1984, regulators were instructed not to close down any more insolvent savings and loans. Thus, the so-called zombie savings and loan was born.



- ⌚ Zombie savings and loans were losing money every day, but the government allowed them to continue operating—losing even more money. And while much of this logic arose from the weak financial footing of the federal deposit insurance fund, it was also the result of another powerful, and rather sinister, force: conflict of interest among some regulators themselves.
- ⌚ Today, the Federal Home Loan Bank System is part of the Federal Housing Finance Agency and is not as prominent a force in the nation's mortgage market as it once was. But during the 1980s, each of 12 regional banks was jointly owned by the savings and loans in its district. And these savings associations directly participated in the governance of their home loan bank.
- ⌚ That relationship made it potentially very difficult for the presidents of the home loan banks to be tough on the institutions they were supposed to regulate. So, the home loan bank presidents and supervisors often preferred to let things go and hope they get better—which is the essence of forbearance.
- ⌚ The savings and loans also had a lot of political clout in Washington. Because they were chartered to help average Americans realize their dreams of home ownership, being against the savings and loans was like being against the flag. The savings and loans had strong lobbying influence and often were big campaign donors.
- ⌚ In 1987, the first congressional savings and loan rescue bill made it into law, which enabled the Federal Home Loan Bank System to borrow from the US Treasury and start to close down zombie savings and loans. But the Federal Home Loan Bank was allowed to borrow only \$3.5 billion a year, which was completely inadequate, because by now approximately 441 institutions were estimated to be more than \$113 billion in the hole.
- ⌚ In 1989, Congress created a new regulatory oversight body called the Resolution Trust Corporation with the express mission to sell off the underlying collateral of all the failed institutions. The corporation did recover some of the money spent to merge or close failed savings and loans and compensate their depositors, but in all, the savings and loan crisis cost taxpayers about \$160 billion, measured in 1995 dollars. This was a huge amount of money, about 1.5% of US gross domestic product at the time. Not many government programs, outside of defense, cost that much.



The main lesson that the savings and loan crisis teaches us is that forbearance is almost never the right policy when financial institutions are encountering difficulties. It almost always makes the problems worse.

SUGGESTED READING:

Mason, *From Buildings and Loans to Bail-Outs*.

Moysich, “The Savings and Loan Crisis and Its Relationship to Banking.”

QUESTIONS TO CONSIDER:

1. One of the hallmarks of the savings and loan crisis was that well-intended regulation actually backfired and made the crisis worse. Are there other examples in recent times in which well-intended regulation also made financial problems worse?
2. Several observers have pointed out that the savings and loan crisis can be blamed on lenient regulation and supervision. To what extent can the same complaint be made about the crisis of 2008–2009?

THE CRASH OF 1987

LECTURE 13

In November 1972, the Dow Jones Industrial Average traded above 1000 points for the first time. Unfortunately, that was its high-water mark for the rest of the decade. The fiscal and monetary stimulus that had produced fast growth during the 1960s had since begun to unleash higher inflation that gradually accelerated. Then, in 1973, the Arab oil-producing countries, together with Iran, imposed an oil embargo that sent energy prices skyrocketing. This spiked inflation and cut into corporate profits by raising the cost of producing and transporting nearly everything in the economy. As a result, the Dow retreated, falling nearly 50% by the end of 1974. Much of the rest of the 1970s became a grinding bear market. Every time the Dow approached its former highs, the index would fall back down again. Meanwhile, the US economy was suffering from stagflation, which refers to the unusual combination of high inflation and low economic growth. And nobody seemed to know how to fix the situation.

INSURANCE AGAINST LOSSES

- ⌚ The tide started to turn in 1982, when the Federal Reserve, led by Chairman Paul Volcker, gave the American economy a dose of very bitter medicine in the form of tight monetary policy. Volcker steadily raised interest rates between October 1979 and August 1981. And the medicine started to work.
- ⌚ Tight monetary policy may have caused the worst recession since the Great Depression, but it also brought the high-inflation era to an end. In addition, the Reagan administration's program of tax cuts and deregulation were by now in full swing.
- ⌚ In late 1982, the stock market started to rise. It flirted with the 1000 level again, breaking through in January of 1983. And this time, it kept going. By the end of 1985, the Dow passed the 1500 mark—that's a 50% rise in just 3 years.
- ⌚ It was a dramatic upward move from the 1970s. Yet people couldn't help but look back over their shoulders. What if the stock market reversed course again? Wasn't there something people could do to protect the profits they had just made?
- ⌚ If you own a stock and want to protect yourself against a decline in its value, one way to do that is to buy a put option on the share, which gives you the right to sell an asset to another party at a predetermined price, called the strike price.
- ⌚ The person who has the right to sell the share is called the holder of the put option. The other contracted party is the seller of the put option. The seller is obligated to buy the share at the strike price if the holder chooses to exercise the put option and sell the share. By choosing the strike price carefully, you can use a put option to protect yourself against a fall in a stock's value.
- ⌚ The purchase of a put option protects you—or insures you—against losses on your shares. That's why such a trade is called a protective put. Protective



puts can be expensive. The person who sells you the option is taking on the risk of buying the share from you at that strike price, and he or she knows that you'll want to exercise your option only if the stock price falls below the strike price, which means he or she will lose money on the deal if that happens. So, he or she will charge you a price that compensates him or her for the risk he or she is taking.

- ⌚ The point is that you can use put options to protect the gains you've made on your shares, but doing so is going to cost you something. And if you have a portfolio with lots of different shares that have grown in value—and you want to protect your gains on each share—then you'll have to buy many different put options. The cost of that could eat up all the profits you're trying to protect in the first place, and then some.
- ⌚ By the mid-1980s, many stock investors naturally wanted to protect their gains while also wanting to see if the market would go even higher. And this is when some smart financial economists stepped in to provide investors the insurance they wanted.

These days, you can buy a single put option that covers many different shares at once. In other words, you can buy a put on an entire portfolio or entire stock index. There are hundreds, if not thousands, of different options on various stock indexes and portfolios, but they weren't widely traded yet in the 1980s.

OPTION PRICING

- ⌚ The theory of option pricing is based on the concept of replication, which is the task of combining several different assets together in a way that mimics, or replicates, another asset. In other words, replication consists of finding a recipe for an exact, or perfect, substitute for an asset.
- ⌚ If the financial markets are well developed, as they are in the United States, then it should be possible to replicate just about any asset. If the market doesn't explicitly provide a put option on a portfolio of stocks, then we can figure out the way to replicate that put option.
- ⌚ In the early 1970s, financial economists Fischer Black and Myron Scholes figured out exactly how to replicate simple put and call options and came up with a pricing model called the Black-Scholes formula. It's really just a recipe you can use to replicate options.

- ⌚ The ingredients in the substitute put option are astonishingly simple. The first is a long position in a risk-free asset. A long position is that of a buyer rather than a seller. So, the replication recipe says to buy a certain amount of a risk-free asset, such as a US treasury security that makes the same payout at maturity no matter what happens. Technically, there are no risk-free assets, but most economists agree that government bonds from the United States are sufficiently low risk to be considered risk-free.
- ⌚ The only other ingredient in the put-option recipe is a short position in the underlying asset that the put option refers to. So, if the put option being traded involves a share of Facebook stock, then you need a short position in Facebook shares to replicate the put option on the shares.
- ⌚ Typically, the way that a short position works is as follows: The holder of the “short” position actually borrows the asset and sells it on the open market. He or she takes in cash from the sale but will have to pay out cash later to buy back the asset and return it to the person he or she borrowed it from. A short position turns a profit when the price of the asset falls, because the holder sells at a higher price now and buys back at a lower price later. This is what provides the insurance payoff when the price of the asset falls.
- ⌚ Now let’s put the 2 pieces of the replicating portfolio together. A put option involves short selling the asset described in the put option contract and using the money from the short sale to buy a covering asset, such as government bonds. This process assumes that at some point in the future, you’ll cash in the government bond and use the money to buy back the asset you sold short. If you get the proportions right, the payoff will match the payoff from the put option.
- ⌚ The put that people began to want in the 1980s was one that would protect an entire portfolio of shares, or even a stock index. So, the substitute, or synthetic, put option consisted of a short position in that portfolio plus the purchase of government bonds. The exact amounts depended on market conditions—most importantly, the interest rate on treasury bonds, the market price of the stock index, and the estimated variability of stock prices.
- ⌚ These are all spelled out in the Black-Scholes formula, so if you know the formula and have access to government bonds and a way to short sell a stock index, you can make your own put options on the index.

- ⌚ One of the first entrants into the new business of providing portfolio insurance in the 1980s consisted of finance professors Hayne Leland and Mark Rubinstein and the professional fund manager John O'Brien. They named their company Leland O'Brien Rubinstein Associates and went into business in 1981. Their brand of portfolio insurance consisted of making put options on portfolios of stocks in the way that was just outlined.
- ⌚ It took them about 3 years to perfect the product, and once they did, they were basically buying treasury securities and short selling Standard and Poor's (S&P) 500 index futures contracts. Note that instead of selling the actual S&P 500 index short, they were selling futures contracts on the index. That was much easier, cheaper, and quicker than working with the index directly.
- ⌚ The S&P 500 index futures contract was, for all intents and purposes, a perfect substitute for owning all of the index shares. A group of professional traders called index arbitrageurs closely followed the price of the futures contract and the prices of individual stocks in the underlying index to watch for discrepancies between the futures contract price and the index aggregate. As soon as they found one, they sold the expensive one and bought up the cheaper one, making a fast profit and forcing the 2 back together.
- ⌚ Index arbitrageurs were constantly pulling stock prices and futures prices back into sync with each other. And at any given time, it was just as likely that the futures price was making stock prices move as was the opposite case.
- ⌚ If the index futures price fell a lot, the futures would pull down stock prices, and if the index futures price rose a lot, it would pull stock prices up. During normal times, this meant that there was no effective difference to investors between holding the S&P 500 index or the S&P futures contract. Their prices behaved the same.

COMPUTERIZED TRADING AND THE CRASH

- ⌚ Synthetic put options called for exact amounts of futures contracts and government bonds to be traded, and quickly. Computers were ideal for this work because you could program the Black-Scholes put-option recipe—along with numbers representing current market conditions—and the computer would automatically fire off the order to the appropriate bond or futures market. The portfolio insurers were big users of early computerized trading.

- ⌚ Meanwhile, as the decade progressed and the stock market started to register solid gains, sales of portfolio insurance took off. About \$1 billion worth of stocks were covered in 1984, rising to \$15 billion in 1985, then \$30 billion in 1986, and somewhere between \$60 and \$90 billion in 1987. This was driven by 2 factors: Other companies, such as Wells Fargo, realized that they, too, could earn nice fees by offering portfolio insurance to their customers; but the main reason was that the stock market was on an impressive bull run.
- ⌚ The Dow index went above 2000 points in early 1987 and to 2500 by July. The S&P 500 showed similarly impressive gains. It rose by 26% in 1985, 15% in 1986, and 39% between January and August 1987. These gains gave stock investors ample reason to want portfolio insurance to protect their profits.
- ⌚ In October 1987, the market started to cool off. There wasn't any individual factor for this that people could point to; instead, a number of developments had negative implications for stocks. For example, the Fed started to complain that inflation was rising again and that it would raise interest rates. In Congress, some representatives were complaining about the size of the budget deficit, which made people suspect that taxes might be going back up.
- ⌚ There was also a lot of public pressure on the government to curb the large amount of corporate merger activity that was taking place, because many people thought these transactions were simply methods for making corporate insiders rich at the expense of the workers who were laid off. An end to the merger party might mean no more bidding wars for corporate shares.
- ⌚ By mid-October 1987, the increased uncertainty was probably enough to prompt many investors—especially those without portfolio insurance—to start taking money off the table by selling shares. In the week that ended on October 16th, the Dow declined by 10%.
- ⌚ If you were holding portfolio insurance, you had been assured that this would be nothing to worry about. And the managers of Leland O'Brien Rubinstein Associates and other portfolio insurance providers probably thought that they had the situation well in hand. But a chain of events was being set in motion that would have devastating consequences.

The whole point of replication was to come up with a recipe that would enable the portfolio insurance providers to create a virtually perfect substitute for an S&P 500 put option. And that recipe basically called for the insurance providers to buy US government bonds and sell S&P 500 index futures contracts.

Although the basic ingredients in a synthetic put option stay the same, the proportions change as the price of the stock index moves. This is one big reason why options are trickier to work with than many other assets. In particular, as the price of the index falls, the recipe calls for you to sell short more futures contracts to maintain your protection. The lower the price of the shares, the more futures contracts the recipe tells you to sell.



- ⌚ During the week of October 12 to 16, 1987, the portfolio insurance companies heavily sold futures contracts to maintain the insurance protection on their clients' accounts. According to exchange records, they sold under \$4 billion worth of futures contracts by the end of trading on Friday, October 16th. But the problem was that wasn't enough.
- ⌚ A government panel known as the Brady Commission that was later tasked with investigating the crash of 1987 found that the portfolio insurance companies would have to have sold \$12 billion worth of futures contracts by the end of that Friday—3 times what they managed.
- ⌚ Still, the selling pressure was enough by the end of that Friday to drive the S&P 500 futures contract price below the traded index level. This situation implied that, come Monday, index arbitrageurs who wanted to make a quick profit by pushing the 2 prices back together would make a deluge of sell orders.
- ⌚ Even people who had no idea about the index arbitrageurs' plans had just seen stock prices fall by 10%, so they had a powerful incentive to sell their own shares as soon as they could, before the market declined further.
- ⌚ According to the Brady Commission's later report, about \$500 million worth of sell orders were waiting for the opening bell on Monday, October 19th. Another half a billion worth came in between 9:30 and 10:00 a.m., and a further \$1.1 billion worth materialized during the following hour of trading.
- ⌚ By 11 a.m., the computerized order routing system at the New York Stock Exchange was overwhelmed. Trade confirmation and reporting slowed considerably. This caused the reported prices to lag behind the actual prices, which in turn caused uncertainty and eventually panic.
- ⌚ Meanwhile, over in the futures market, the portfolio insurance companies still had to sell billions of dollars of contracts just to keep up with the results from the previous Friday. The additional selling put more downward pressure on the stock index futures price, and that placed yet more downward pressure on the stock market.
- ⌚ What emerged was a vicious cycle that no one in modern memory had seen before. The portfolio insurance companies were committed to protecting their clients' shares by creating synthetic put options.



DID COMPUTERIZED, OR PROGRAM, TRADING CAUSE THE CRASH OF 1987?

Several economic and financial events had already raised uncertainty in the stock market and made a sell-off more likely. In addition, the market had risen very quickly, increasing people's incentives to sell once it started to decline. So, it's not fair to say that the program trading utilized by the portfolio insurance companies and other market players started the market correction.

On the other hand, it is fair to say that portfolio insurance turned a market correction into a steep crash. Once prices were falling, program trading amplified the decline and caused a rapid downward spiral that overwhelmed the ability of the system to keep up.

But as stock prices fell, the portfolio insurance companies had to sell still more contracts. And the number accelerated because the proportions in the put-option recipe were also changing as the stock index declined.

- ⌚ Because the stock exchange's order system was lagging due to massive trading volumes, exchange prices and futures prices essentially became delinked. By 2 p.m., the prices reported on the New York Stock Exchange were up to 1 hour late. Stockholders kept selling their shares, though, and the exchange kept trading until its usual 4 p.m. close.
- ⌚ People were operating in the dark, unloading shares in the hope that they wouldn't lose too much. It was classic panic selling. One silver lining is that the index arbitrageurs had stopped playing their game because the selling pressures and time lags made the strategy too dangerous. This disrupted the vicious circle perpetuated by the portfolio insurance.
- ⌚ When the trades were finally tallied that day, the Dow Jones index had lost 508 points, or 23% of its value. That was more than 3 times as large as any other single-day decline in the previous 30 years. Even the 1929 market crash had daily price drops of closer to 10%.
- ⌚ The S&P 500 futures contract lost 29% of its value that day. Index arbitrageurs accounted for 15% of all stock trading volume on the New York Stock Exchange even though they eventually stopped trading, and portfolio insurance companies accounted for 43% in volume terms of stock index futures contracts.
- ⌚ Fortunately, the Monday crash didn't continue. The Fed announced that it was ready to provide liquidity to the markets, and this calmed the situation. Stock prices stabilized near their postcrash levels and, within a few months, started to climb again.
- ⌚ In a little more than 2 years after the crash, the Dow surpassed its precrash high. In the meantime, people wondered what had caused the market to fall so abruptly and what, if anything, should be done about it.
- ⌚ The New York Stock Exchange implemented temporary "circuit breakers" to pause trading when prices fell too quickly. The idea was that a pause would give traders a chance to catch their breath and assess the situation more clearly.

These days, amid a proliferation of online financial services that claim to be free, another lesson that the stock market crash of 1987 offers is this: Before you use a new service that supposedly doesn't cost anything, ask how the provider can afford to offer you something for nothing. These so-called free services might end up being quite expensive.

For example, if the service provider goes bankrupt and your accounts with them are frozen, how costly will that be for you? What if the provider sells information about your financial habits? What if the provider skimps on security?

Think carefully about each service provider you work with and try to understand how you are actually paying for whatever service it provides.

SUGGESTED READING:

Kyrillos, “Leland O’Brien Rubenstein Associates Incorporated.”

Lewis, ed., *Panic!*, part I.

Presidential Task Force on Market Mechanisms, *Report of the Presidential Task Force on Market Mechanisms*.

QUESTIONS TO CONSIDER:

1. The crash of 1987 has left a lasting impression on the markets. Even today, finance experts claim that the stock market has “crashophobia,” an exaggerated fear of a large stock market crash. Given what you have learned in this lecture, do you think that a one-day crash of 20% or more is worth worrying about, or is it a special case caused by the unusual circumstances of 1987?
2. Suppose that you have been investing in the stock market for several years and your portfolio has dramatically increased in value—by 50% or more. What do you think is your best strategy to protect the value of your portfolio? Can you make a case for not insuring or protecting your portfolio at all?

JAPAN'S LOST DECADE

LECTURE 14

In the 1980s, the Japanese economic machine seemed unstoppable. Big Japanese companies looked like they would keep growing and dominate their respective markets forever, and Japanese banks were aggressively expanding into the United States. But within a decade, the Japanese economy imploded. Its banking system was at the heart of the collapse, plunging the country into stagnation for more than 2 decades. The Japanese banking catastrophe was really a crisis of the entire Japanese economic model, including the role played by the government.

THE JAPANESE FINANCIAL SYSTEM

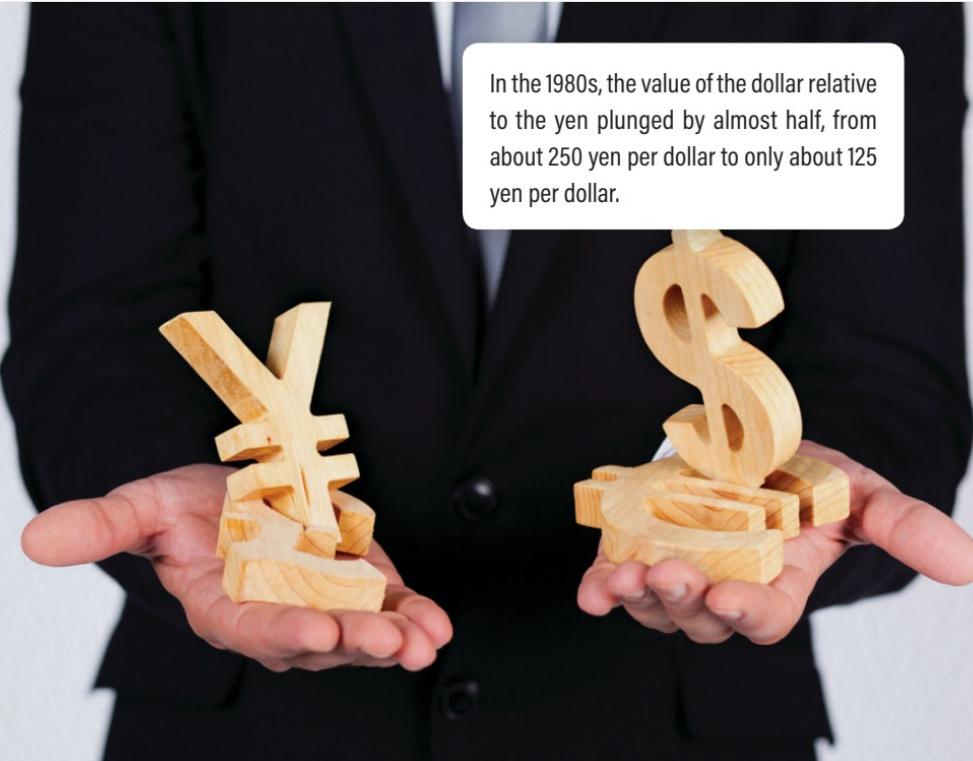
- ⌚ The Japanese model was a form of capitalism but with a high degree of government coordination. Its powerful Ministry of International Trade and Industry pursued a policy of export-driven growth by selecting industries and companies for government assistance. This was to help them become internationally competitive—and able to export much of their production.
- ⌚ At the same time, the Japanese financial system was regulated in a way to support the government's industrial policy. The banking system was divided into 3 types of institutions, each with a special role:
 1. The city banks were large lenders based in the biggest population centers. They focused on making short-term loans to large, export-driven manufacturing companies.
 2. Regional banks focused on making short-term loans to small and medium-sized companies, many of which produced parts, or subassemblies, for the large manufacturers.
 3. Long-term credit banks provided the long-term business loans that companies needed.
- ⌚ Also, Japanese banks were allowed to own the stocks of companies with which they did business, and they often did so to cement their relationships with their best customers.
- ⌚ None of these banks were focused on consumer loans, and that was intentional. The main mission of the banks was to funnel household savings to business. This helped keep consumption lower than it would have been otherwise.
- ⌚ That also helped tilt the economy toward higher exports. Japan did have lenders that specialized in consumer lending, especially credit cooperatives, which are like credit unions. And eventually, specialized nonbank institutions called *jusen* were created to specialize in residential mortgage lending.
- ⌚ As in other countries, the interest rates that Japanese banks paid on deposits and earned on loans were tightly regulated through the mid-1990s. In addition, regulators in the Ministry of Finance controlled the types of products that banks could offer, and they were generally quite conservative.

- ⌚ In fact, the Ministry of Finance really controlled Japanese banking policy for most of the postwar period. The laws passed by the parliament were vague and relied on the bureaucrats at the ministry for practical interpretation and implementation.
- ⌚ Realizing how much power was in the hands of the bureaucrats, Japanese banks created special liaison positions that did nothing but interact with their regulatory supervisors. In addition, Japanese bank supervisors often retired early and started second careers in the same banks they'd supervised.
- ⌚ Because of this cozy relationship with their regulators, the banks were sheltered from competition and public scrutiny. Japanese accounting standards were much laxer than in the United States, so it was difficult to tell the true financial condition of a lender unless you were the manager. The real information sharing that took place was between the bank's liaison and the Ministry of Finance.
- ⌚ But the Japanese system was even more paternalistic than that. Regulators practiced what has been called a convoy system for the banks. And it had a lot in common with a convoy of ships. The system never moved faster than its slowest members, which meant that product and technical innovation was slow to nonexistent.
- ⌚ Also like a convoy, the strong members were called on to help the weak ones. The Ministry of Finance had a policy of not allowing any of its institutions to fail. When a bank or other credit institution got into difficulty, the ministry would arrange a merger with a healthy partner. It would grant the acquiring institution some regulatory favors as an incentive—which was a strong incentive because there were few other ways that Japanese banks could obtain even a small competitive advantage over their peers.

THE BUBBLE ECONOMY

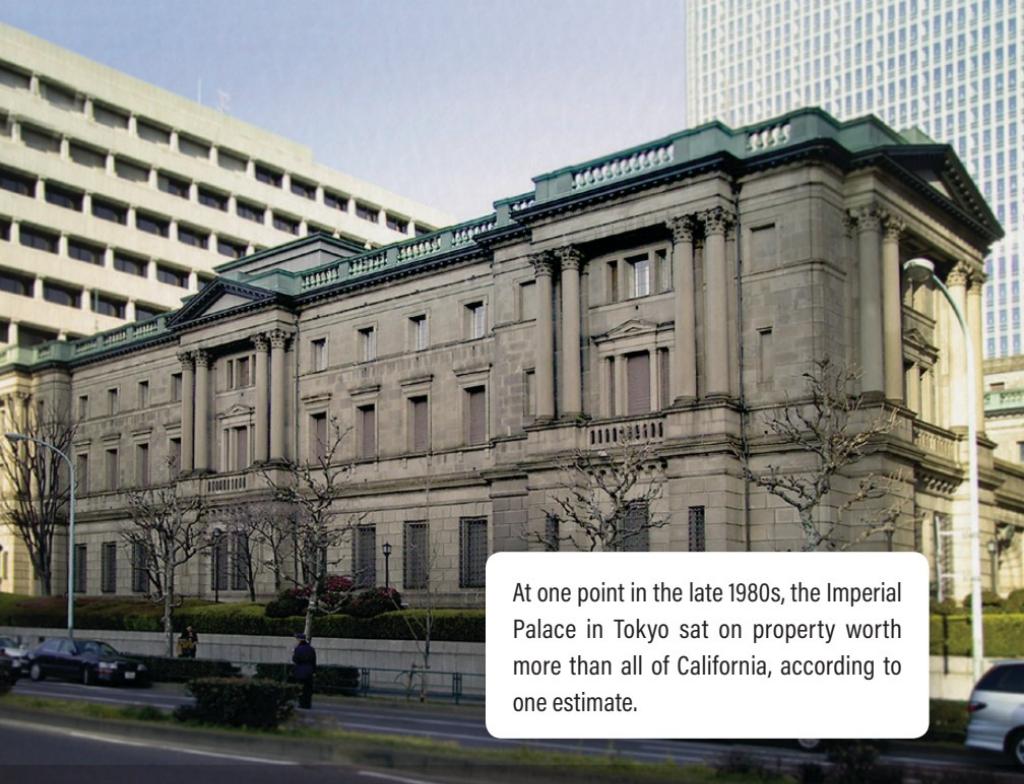
- ⌚ For a time, this system of cozy cooperation did a great job of fueling Japan's economic growth, which averaged more than 5% a year, adjusted for inflation. Japan became the world's second-largest economy, and many of its companies were household names because of their innovative and high-quality products. But Japan also became a victim of this success.

- ⌚ Regulators at the Ministry of Finance initially tried to keep Japan's domestic corporate bond market small so that companies would be forced to borrow from the banks. But by the mid-1980s, blue-chip firms like Mitsubishi and Matsushita were so big and well known that they'd gained access to the global bond market and could now issue bonds to American and European investors in just about any currency.
- ⌚ In addition, because Japan ran huge trade surpluses with the United States and other developed countries, as well as with developing countries in Asia, the surpluses placed tremendous upward pressure on the Japanese currency, the yen, to appreciate. At the same time, global investors wanted to share in the success of Japanese companies by buying stock in Sony, Toyota, and other big names. This also increased the demand for yen.
- ⌚ So, the yen soared in value relative to the dollar. The effect of this was to raise the foreign cost of Japanese exports by a significant amount. That would have been bad for Japanese exports and, in turn, for Japanese growth. So, the Bank of Japan responded by lowering interest rates quite rapidly to help reduce the value of the yen—and keep exports high.



In the 1980s, the value of the dollar relative to the yen plunged by almost half, from about 250 yen per dollar to only about 125 yen per dollar.

- ⌚ These big changes that hit the Japanese financial system at the same time were shocks to the system that set off a chain reaction, taking the Japanese economy on a wild ride. The large population-center banks now had to find new loan customers, and quickly. So, they began to lend to the small and medium-sized companies that the regional banks had specialized in lending to.
- ⌚ The city banks didn't have any particular expertise in lending to these companies, but that didn't dissuade them. They simply asked the companies to put up real estate as collateral for their loans. Japanese land prices had been moving steadily upward throughout the postwar era, so it seemed like a safe and easy bet.
- ⌚ The regional banks also had to find new customers, so they started lending to real estate developers, based on much the same logic.
- ⌚ Land prices rose quickly. And this sent something of a false signal as to both the attractiveness and soundness of Japanese real estate. Consequently, Japanese financial institutions devoted even more of their lending portfolios to real estate loans, construction loans, and loans collateralized by real estate.
- ⌚ And the central bank—the Bank of Japan—was pumping liquidity into the system. The total amount of outstanding loans went from 70% of gross domestic product (GDP) to 120% of GDP within a few years.
- ⌚ Real estate lending didn't account for the entire increase. *The Wall Street Journal* sifted through Japanese banking documents of the time and reported that the nation's lenders virtually threw money at loan customers to keep their loan portfolios growing.
- ⌚ One small manufacturer asked what he should use the money for, and the banker told him to buy stocks, so he did. That wasn't necessarily bad advice. The stock market was appreciating as quickly as real estate during the late 1980s. And many loans ended up funding stock purchases.
- ⌚ In addition, Japanese savers who were looking for higher yields than they could get from the banks flocked to special life insurance policies, which included saving features. Part of the premium bought a life insurance benefit while the rest went into a savings account redeemable when the contract matured.



At one point in the late 1980s, the Imperial Palace in Tokyo sat on property worth more than all of California, according to one estimate.

The life insurers offered high guaranteed interest rates on the savings portion of the account, which they tried to recoup—and profit from—by investing in stocks.

- ⌚ Some Japanese started to refer to the late 1980s as the bubble economy. The price of property in Japan more than doubled between 1985 and 1990. Also, the Nikkei stock index rose from a value below 20,000 in 1987 to its all-time high of 38,916 on December 29, 1989. And one analyst predicted that it would double again to 80,000 by mid-1990.
- ⌚ Officials at the Bank of Japan and the Ministry of Finance viewed the concentration of lending in real estate and related businesses as a danger to the banks' health and feared that the huge increase in asset prices could set off inflation in the rest of the economy. But the government's commitment to holding down the value of the yen kept it from taking action until things really got out of control.

THE BURSTING OF THE BUBBLE ECONOMY

- ⌚ In May 1989, the Bank of Japan raised interest rates for the first time in 9 years. This was followed by increases in October and December 1989 as well as in March and August 1990. In all, the Bank of Japan more than doubled the discount rate—the rate it charged the banks—from 2.5% to 6% in a little more than a year. The Ministry of Finance also imposed restrictions on real estate lending that covered insurance companies and credit cooperatives as well as banks.
- ⌚ Some view these actions as deliberate attempts to deflate Japan's bubbles in the stock and real estate markets, although some economists disagree with this interpretation. The stock market was the first to respond, losing a quarter of its value in the spring of 1990 and continuing to fall.
- ⌚ By March 1992, the Nikkei was back below 20,000, and it was below 15,000 by August 1992. Land prices took longer to reset, starting to decline in 1991 and continuing to fall for the rest of the decade. By 1997, commercial real estate was down by more than 70% from its peak value.
- ⌚ The bursting of the bubble caused immense pain for the banks. Not only had they overindulged in real estate and related lending, but they also had a special vulnerability to a fall in stock prices.



- ⌚ In total, Japanese banks owned shares equivalent to about 20% of the total domestic market. And the banks were allowed to count market gains on those shares toward satisfying their regulatory capital requirements. That worked great when stock prices were high and rising, but it backfired after stock prices fell. Many banks now ran the risk of violating their minimum capital requirements and having to curtail lending because of the drop in stocks.
- ⌚ But surprisingly, the dual collapse of stock and real estate prices didn't cause a systemic failure right away. It took more than 6 years for a full-blown bank crisis to develop. The reckoning was delayed by a massive program of regulatory forbearance on the part of the Ministry of Finance.
 - ⌚ It adopted the tactic of always understating the amount of bad loans that were accumulating inside Japanese banks. For years, it recorded less than half the true figure, and often much less than half.
 - ⌚ It allowed banks to use some sketchy accounting practices. In 1992, it allowed banks to defer the reporting of any losses on their stock portfolios for an entire year. Later, it allowed banks to report the value of their stock holdings at the purchase prices, even though the values had by then fallen below the purchase price.
 - ⌚ It used an incredibly lenient definition of a nonperforming loan. A borrower had to go 6 months without making any payment—even a token payment—before a loan was categorized as bad. And even after loans went bad, the ministry allowed banks to hide them and turned a blind eye to the practice of transferring bad loans to companies that existed only on paper. Regulators even advised banks on how to conceal their losses.
- ⌚ Apart from direct forbearance, the Ministry of Finance also tried to ease the pressure on banks in indirect ways.
 - ⌚ It pressured public pension funds to buy stocks as part of what the ministry called price-keeping operations.

In 1993, when the top 20 banks in Japan self-reported about 13 trillion yen in bad loans, private observers estimated that a more accurate number was 4 to 5 times that amount.

- ⌚ It pressured the Bank of Japan to continue cutting interest rates. This was a very successful tactic because the bank was traditionally run by former Ministry of Finance employees. The central bank lowered its discount rate below 2% by the end of 1993 and to just 0.5% by the fall of 1995. Low interest rates helped the banks in several ways, although they also made it harder for banks to earn their way out of trouble.
- ⌚ It published overoptimistic economic forecasts, which made it seem like the Japanese economy was on the verge of turning around. Therefore, it appeared more reasonable to allow the banks to continue to nurse questionable loans in the hopes that their quality would improve as the economy grew.
- ⌚ And when there was a problem that simply couldn't be ignored, the ministry could always fall back on the convoy system to buy more time.

JUSEN AND THE BREAKDOWN OF THE CONVOY SYSTEM

- ⌚ As early as 1991, the fall in real estate prices began to cause problems at the nonbank lenders, or *jusen*, who borrowed from other financial institutions, such as banks, and then made mortgage loans. Early in the bubble, the *jusen* had been squeezed out of the mortgage market as regional banks and other lenders pushed in, so they moved into much riskier commercial real estate lending.
- ⌚ In addition, many large city banks helped to set up the *jusen* and funneled their riskiest real estate borrowers to them. The upshot is that the *jusen* were canaries in a coal mine; about 38% of their loans went bad by 1991.
- ⌚ In just about any other circumstance, this would be considered insane proportion, and the institution would be closed immediately. But not under the convoy system. The Ministry of Finance arranged a quasi-bailout in which the main lenders to the *jusen* were told to reduce the interest rates on the loans they had already extended and promise to keep extending new loans.
- ⌚ If a bank had helped to found a particular *jusen*, it would have to forgive some of its loans to the institution. That relief didn't actually work, but it did buy a few years.

- ⌚ In 1993, the *jusen* were in trouble again, because the economy didn't recover and property prices continued to fall. But the ministry simply doubled down on its prescription of loan forgiveness and cuts in interest rates.
- ⌚ By 1995, the *jusen* were in worse shape than ever. About 75% of their loans had gone bad, and it was estimated that 60% were completely unrecoverable. Once again, Japanese convoy principles guided government plans for a bailout.
- ⌚ Banks that had founded *jusen* now needed to absorb more than half the bailout cost of about \$60 billion. Other banks had to absorb about a quarter of the cost. The rest was divided between agricultural credit cooperatives—which were also big lenders to the *jusen*—and Japanese taxpayers.
- ⌚ Meanwhile, because bank managers knew that everyone was hiding big losses, they became reluctant to participate in ministry-sponsored mergers. And the convoy system started to break down.

THE LOST DECADE

- ⌚ In 1994 and 1995, several credit cooperatives and one regional bank failed. This time, no private banks agreed to ministry requests to purchase the failing institutions. So, the Ministry of Finance created 2 new banks as acquisition vehicles. Some banks and other businesses contributed funds, but much of the financing was obtained directly from the Bank of Japan.
- ⌚ Finally, the weak economy, lack of corrective action, and growing distrust on the part of the public pushed several large financial institutions past their breaking points. In April 1997, Nissan Mutual Life Insurance went bankrupt—the first Japanese insurance company to fail in half a century.
- ⌚ The really big fireworks came in November, when 2 banks and 2 brokerage firms collapsed. One of the brokerages, Yamaichi Securities, had been the country's fourth-largest broker, and the insolvent Hokkaido Takushoku Bank was the country's 10th-largest bank.
- ⌚ These failures surprised the markets. Even worse, they surprised and shocked the Japanese parliament. The Ministry of Finance had done too good a job of hiding the industry's problems from the outside world. That was now over, but only because the banking system was in a true state of crisis.

- ⌚ The Minister of Finance and the governor of the Bank of Japan had to issue a joint statement promising that no other bankruptcies were forthcoming and admonishing the public to ignore what they called irresponsible rumors.
- ⌚ Japan's ruling party, the Liberal-Democratic Party, was now jolted into action, promising to authorize public funding to resolve the banking imbroglio. By February 1998, almost \$250 billion had been committed. But nearly every observer believed that amount was much too small to solve the problem. And the rescue would be doubled later that year.
- ⌚ This money was directed to the Deposit Insurance Corporation of Japan, which up to that point had been so underfunded as to be a nonparticipant in the bank-resolution process. With its new war chest, the agency was authorized to recapitalize banks by buying shares in them and even to take over institutions that were nearly insolvent.
- ⌚ It ended up exercising its conservatorship power by taking over 2 large and internationally active long-term credit banks, both of which had been picked by the markets as the next big institutions to go under. And the belief rapidly became a self-fulfilling prophecy.
- ⌚ The other major change that the government implemented was the reorganization of the Ministry of Finance. Bank supervision was placed under a new umbrella agency that was carved out of the Ministry of Finance, and a new office was created to oversee this new agency and to make decisions on whether to take over a failing bank and, if it did, how to dispose of its assets. Finally, the government created a bank-disposition agency to purchase bad loans from any bank and then liquidate them over time.
- ⌚ Unfortunately, even these reactions didn't seem to fix the Japanese banking system, or the economy. A big reason is that despite the changes, banks were never really forced to get rid of their bad loans. If a bank was not in direct danger of failing, then it could still muddle through and pretend everything was okay until the stock market and the economy improved again. But the stock market and the economy didn't improve, for a very long time.
- ⌚ Japanese economic growth fell to the lowest rate among developed countries and stayed there for more than 2 decades. The average growth rate of inflation-adjusted GDP between 1995 and 2002 was only 1.2% a year in Japan. The Japanese started to call the period the lost decade.

The one big lesson that the Japanese banking crisis offers is that after a financial crisis, the economy won't improve until you fix the banks—that is, the banks have to be put back in shape so that they're willing and able to go back to their normal business of taking deposits and making loans.



SUGGESTED READING:

Amyx, *Japan's Financial Crisis*.

Kanaya and Woo, "The Japanese Banking Crisis of the 1990s."

QUESTIONS TO CONSIDER:

1. What are the similarities between the regulatory treatment of banks in Japan and the savings and loan associations in the US in the lead-ups to each country's respective crisis? Were both sets of regulators motivated by the same incentives?
2. One lesson that regulators and policy makers in other countries may have learned from the case of Japan is not to intentionally burst asset price bubbles, because this leads to bad consequences. Do you agree with this advice? Should central bankers or other economic policy makers take steps to deflate or burst asset price bubbles that they believe have appeared in their economies? Why or why not?

BANKERS TRUST SWAPS

LECTURE 15

The most popular financial derivative is the interest rate swaps, which are heavily used precisely because they're so helpful, easy to understand, and safe to use. In fact, they haven't been implicated in major financial crises or disasters—except for one. In 1993 and 1994, a large New York financial institution known as Bankers Trust was sued multiple times by customers with whom it had entered into interest rate swap agreements and had lost tens of millions of dollars. This was more than these large, well-known companies thought was possible, and they suspected they had been cheated. When the facts of the cases came to light, the Bankers Trust swaps became one of the most fascinating and colorful financial scandals of the 1990s.

A derivative is a financial contract that derives its value from an underlying asset.

INTEREST RATE SWAPS

- ⌚ The word “swap” in finance denotes an equal exchange of 2 different sets of cash flows, or assets. Each side of the deal receives something that at least initially has a value believed to be exactly equal to the value of the thing they give up. This determines how every swap is priced. A swap is priced correctly when the present value of the cash flows paid by one side of the swap equals the present value of the cash flows paid by the other side of the swap.
- ⌚ There are many ways to look at cash flows. For the purposes of this course, think of them as any cash payments made into, or flowing out of, a financial instrument or a business. And “present value” refers to the amount of money that someone would be willing to pay today to receive something of value in the future.
- ⌚ In an interest rate swap, 2 contracting parties agree to exchange interest payments with each other, generally every 6 months. But the exchanges can also take place more or less frequently.
- ⌚ The interest payments exchanged are different from one another. One counterparty makes payments based on a fixed rate of interest that doesn’t change over the life of the contract, or swap; the other counterparty makes payments based on a floating interest rate that can, and usually does, vary.
- ⌚ This floating interest rate traditionally was pegged to the London Interbank Offered Rate (LIBOR), which is the interest rate at which big banks in London historically lent money to each other on a short-term basis.
- ⌚ To exchange interest payments, both an interest rate and a principal amount are needed. In interest rate swaps, the 2 counterparties agree on a principal amount—that is, the size of the deal—called the notional principal of the swap, because it exists only as an idea, or notion. Still, it’s important because it determines the scale of the payments to be exchanged.
- ⌚ In practice, the 2 counterparties don’t exchange the full payments with each other. Instead, one net payment is made from the person paying the higher interest rate to the person paying the lower interest rate. Then, the process repeats, or resets, using the language of swaps.

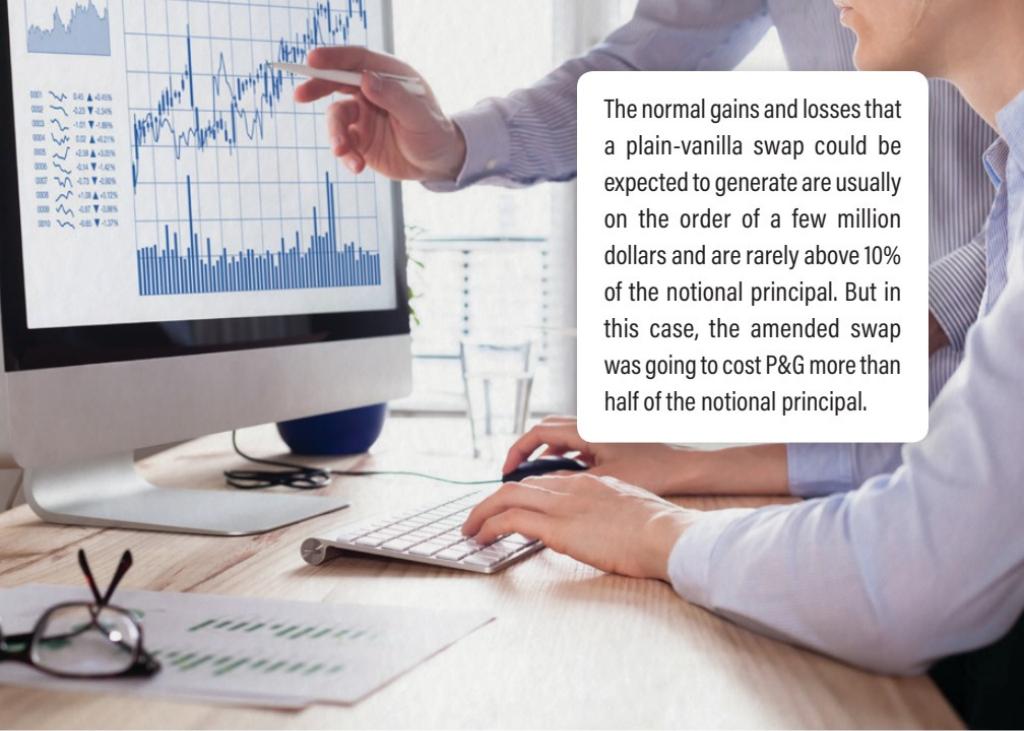
- ⌚ Each year, after the counterparties exchange the net payment covering the previous year, they observe the current 1-year interest rate being charged in the market. Next year's net payment will be based on this new 1-year interest rate.
- ⌚ If the 1-year rate has risen, the floating-rate payer owes the fixed-rate payer a net payment at the end of the next year. The fixed-rate payer has certainty over what he or she will be paying while the floating-rate payer does not.
- ⌚ There are many uses for interest rate swaps, but one of the main reasons is that they help businesses convert floating-rate debt into fixed-rate debt and earn some peace of mind by hedging against interest rate changes.
- ⌚ For many companies—especially small to medium-sized ones—it's very expensive to borrow at fixed interest rates, so instead, they borrow using floating interest rates. In addition to converting its floating-rate debt to fixed-rate debt, the use of a swap can enable the company to structure its debt so that it pays a lower fixed rate than it could get at a bank or other traditional source of credit.
- ⌚ Large companies are usually very comfortable borrowing at floating rates because they have big treasury departments focused on financing the company's activities. Their objective is to achieve the lowest funding costs they can, and they'll often borrow at a fixed rate and use a swap to convert that borrowing into floating-rate debt. This can enable the company to borrow at what, at least initially, are extremely cheap rates; in fact, it's common for large companies to pay rates that are lower than LIBOR, which helps explain their massive popularity.
- ⌚ Swaps frequently help companies obtain cheaper financing than they could if they simply went to the local bank or issued bonds. There's nothing inherently dangerous about this, as long as the counterparties are financially sound and interest rates aren't subject to extraordinary and ahistorical changes. Their use has become so standard that many people use the term "plain-vanilla swap" to denote an exchange like this one.
- ⌚ There are other uses for interest rate swaps, including for speculation on future interest rates. If you think interest rates will rise in the future—and you want to bet on your view—you'd choose to be the fixed-rate payer in an interest rate swap because you believe the floating-rate will rise above

today's fixed swap rate, meaning that the floating-rate payer will owe you money in the future. In the same way, if you want to bet that interest rates will fall in the future, you'd want to be the floating-rate payer, since you'd expect your payments to fall below the value of today's fixed-rate payments.

THE P&G AND BANKERS TRUST SWAP

- ⌚ Interest rate swaps were relatively new in the early 1990s, and some standards governing their use hadn't quite been worked out. For example, in the United States, the floating interest rate that was commonly used for swaps at the time was the US commercial paper rate rather than LIBOR.
- ⌚ A larger concern was that companies were in the learning phase about how to use and work with interest rate swaps. Today, corporate financial managers are intimately familiar with swaps and are comfortable using them. But during the early 1990s, even the largest companies were testing the waters and seeing what swaps could do for them.
- ⌚ This was the case at Procter & Gamble (P&G), which began to enter into interest rate swaps with Bankers Trust early in the decade. In late 1993, a standard, or plain-vanilla, swap between P&G and Bankers Trust matured, or expired.
- ⌚ During the course of this deal, P&G had been able to save a lot on its funding costs because it earned profits on the swap. P&G was paying a floating rate of interest tied to the commercial paper rate and was receiving fixed-rate payments from Bankers Trust. And interest rates were falling during the time period covered by the swap.
- ⌚ After this plain-vanilla swap matured, Bankers Trust offered P&G a new swap. But this one wasn't plain vanilla. Instead, it was a so-called proprietary swap, meaning that it was one specially drawn up by Bankers Trust for P&G.
- ⌚ This swap—the notional value of which was \$200 million—was still based on an exchange of fixed-rate and floating-rate payments, and P&G would be paying the floating rate. But instead of using the commercial paper rate or LIBOR as the floating interest rate, Bankers Trust was offering a floating rate determined by a new formula.

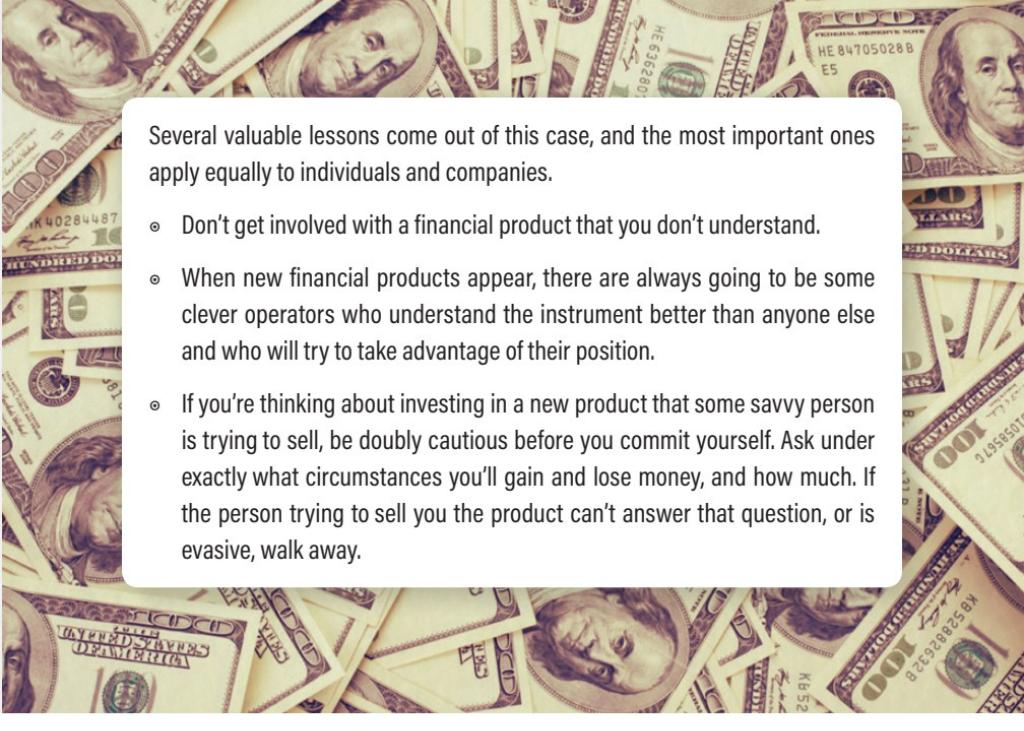
- ⌚ The floating rate started out as the commercial paper quotation minus 0.75%, so the base floating rate was very attractive to P&G. But Bankers Trust added what it called a spread to the base floating rate that was greater than zero and an amount that depended on the difference between the 5-year US treasury interest rate and the price of the 30-year US treasury bond—roughly equal to 17 times the 5-year treasury interest rate minus the current price of the 30-year treasury bond.
- ⌚ At the start of the swap, the difference was negative, and P&G started out paying a low floating interest rate. P&G found this attractive, but its managers didn't pay enough attention to what would happen as interest rates changed—specifically, the spread would increase a lot if interest rates rose.
- ⌚ Without realizing it, the managers of P&G had effectively made an aggressive bet that interest rates would stay the same or fall. If interest rates did, then that spread would remain negative, and nothing would be added to the base floating rate they'd pay in the swap. But if interest rates rose, then the spread would become positive and rise very quickly, causing the floating interest rate that P&G had to pay to soar.
- ⌚ After these events played out, economists figured out that Bankers Trust had talked P&G into taking a short position in a particularly nasty put—or sales—option on interest rates, with limited upside for P&G and huge downside risk.
- ⌚ In February 1994, the Federal Reserve started to express concern about inflation and began an unusually aggressive round of interest rate increases, so the spread part of the floating rate of the swap went from negative to positive—to huge—in a matter of months.
- ⌚ P&G asked Bankers Trust to amend the swap to lock in the spread so that it wouldn't increase anymore, and Bankers Trust agreed to modify the contract. The value of the spread that they locked in was more than 14%. So, P&G went from paying the commercial paper rate minus 0.75% to paying the commercial paper rate plus more than 14%. It went from being a narrow winner in the swap to being a big loser.
- ⌚ At the time the 2 sides agreed to amend the swap, P&G agreed to absorb a loss of more than \$100 million to cut its losses on just this one swap. This was a huge outlier for such deals at the time.



The normal gains and losses that a plain-vanilla swap could be expected to generate are usually on the order of a few million dollars and are rarely above 10% of the notional principal. But in this case, the amended swap was going to cost P&G more than half of the notional principal.

- ⌚ P&G decided to sue Bankers Trust. Two other companies, Gibson Greetings and Air Products, also sued the investment bank after losing money on proprietary swaps. As a result, Bankers Trust became subject to an immense amount of public scrutiny, and what lawyers and journalists discovered was quite interesting.
- ⌚ Bankers Trust had gone strongly into the derivatives business after the merger-and-acquisition wave of the mid-1980s subsided. By the early 1990s, the bank was making a third of its profits from derivatives sales, specializing in swaps. It had more than 400 people working on derivatives sales, and they generally were comfortable working with advanced derivatives pricing models. In turn, Bankers Trust salespeople increasingly focused on selling custom, proprietary swaps.
- ⌚ Inside the company, the corporate culture took an ugly turn. Customers who used to be referred to as clients were now called counterparties. The change in language reflected an increasingly adversarial position that Bankers Trust took toward its customers.

- ⌚ Salespeople were given a target profit rate of 30% on each deal, and their compensation was closely tied to the profits earned. A former managing director said, “The thinking was, if these guys are stupid enough to buy these things we have cooked up, then we will be smart enough to sell them.”
- ⌚ Bankers Trust employees took advantage of their knowledge in various inappropriate ways. For example, some of the details of the swaps that Bankers Trust did with Gibson Greetings were so complex that only the investment bank had the ability to calculate the payments. This gave the bank the ability to disguise the counterparty’s losses and let the losses build up.
- ⌚ The P&G case did go to trial, but the judge in the case, John Feikens, made several rulings that basically shut the door on future lawsuits. The gist of the judge’s opinion was that sophisticated players in the financial markets, including the treasury departments of large corporations, were responsible for doing their own due diligence.
- ⌚ Bankers Trust settled with both P&G and Gibson Greetings, and financial regulators also took disciplinary actions against Bankers Trust. Bankers Trust also signed a consent decree with the Securities and Exchange Commission and the Commodity Futures Trading Commission acknowledging that the firm had misled its clients and violated the antifraud provision of the Commodity Exchange Act. Still, the bank neither admitted nor denied wrongdoing, and it was slapped on the wrist with a fine of \$10 million.
- ⌚ P&G, Gibson Greetings, and other companies should not be let off the hook, though. Their financial managers deserve a share of the blame for getting themselves into this. Classic hedges protect a position you have in another instrument, but there can be a thin line between hedging and speculating. These corporate managers tried to turn financial hedges into profit centers. The P&G managers’ success at using plain-vanilla swaps might also have made them overconfident about their ability to understand and use much more complex variations, such as the proprietary swaps offered by Bankers Trust.
- ⌚ Fortunately, this episode didn’t prevent the interest rate swap market from continuing to grow and develop. Standard, or plain-vanilla, swaps are among the more beneficial financial innovations of the past few decades. It would have been a shame had the abuses of these instruments created a legal backlash or scared people away.



Several valuable lessons come out of this case, and the most important ones apply equally to individuals and companies.

- Don't get involved with a financial product that you don't understand.
- When new financial products appear, there are always going to be some clever operators who understand the instrument better than anyone else and who will try to take advantage of their position.
- If you're thinking about investing in a new product that some savvy person is trying to sell, be doubly cautious before you commit yourself. Ask under exactly what circumstances you'll gain and lose money, and how much. If the person trying to sell you the product can't answer that question, or is evasive, walk away.

SUGGESTED READING:

Jacque, *Global Derivatives Debacles*, chap. 12.

Overdahl and Schachter, "Derivatives Regulation and Financial Management."

QUESTIONS TO CONSIDER:

1. Given the information in this lecture, how would you assign blame between Bankers Trust and the company treasuries they dealt with, such as Procter & Gamble's treasury? What do you think is needed to ensure that deals like this do not occur in the future?
2. Is there a way to ensure that corporate treasurers, or any portfolio managers, use derivatives only for hedging rather than speculation? If so, what is it? If not, should we still try to limit speculation? How?

ASIA, GREECE, AND GLOBAL CONTAGION

LECTURE 16

When a currency falls in value by a dramatic amount in a short period of time, the event is called a currency crisis. During a currency crisis, the prices of imported goods and services skyrocket in the country that has undergone the devaluation. This forces families to cut their consumption and can prod companies that rely on imported supplies to stop production. The drop in aggregate demand is usually quick and deep, causing a nasty recession, and the country's financial system is often paralyzed. A big drop in the value of a country's currency makes its exports much cheaper and, therefore, more competitive in global markets, meaning that countries that undergo currency crises are likely to eventually recover as their exports grow. But in the short term, a devaluation causes intense economic and financial pain for nearly everyone in the country. On net, the benefits typically do not outweigh the costs. Most countries would rather avoid a currency crisis if they can. But that seems to be very difficult.

EXCHANGE RATES

People often find exchange rates confusing. To make it easier, we can treat the exchange rate like any other price, whether for cookies or gasoline. We quote these prices in dollars per unit, such as 50¢ per cookie or \$3 per gallon. Similarly, the exchange rate can be defined as the price of a unit of foreign currency in dollar terms. Many exchange rates, such as the dollar-British pound exchange rate, are quoted this way.

Currencies that are valued at less than a dollar per unit, such as the Japanese yen, are frequently quoted in reverse fashion: 100 yen per dollar. However, let's stick with the convention of quoting the exchange rate in terms of dollars per unit of currency. So, using this example, let's quote the Japanese currency as 1¢ per yen.

The nice thing about this convention is that when a currency's price in dollars and cents increases, that means that its value increases. And when the currency price in dollars decrease, its value decreases. Quoting it this way makes it easier to represent a currency crisis graphically and to calculate the size of the drop in the value of the currency.

To this end, we can use a simple supply and demand model with the number of units of the foreign currency on the horizontal axis and the price of that currency, quoted in dollar terms, on the vertical axis.

This way of representing the market for a currency assumes that it's being traded for US dollars. There's a downward-sloping demand curve, which is the demand for the foreign currency, and an upward-sloping supply curve, which is the supply of this currency.

THE THAI BAHT

- ⌚ In the mid-1990s, the exchange rate for Thailand's currency, the baht, was fairly constant at about 4¢ a baht, or about 25 baht per US dollar. During the 1997 currency crisis, though, the price of the baht fell to around 2¢ per baht. To reduce the value of the baht by half, either the demand for the Thai currency had to fall a lot or the supply of baht would have to rise a lot—or both. And this would have to occur quickly.



The US dollar has had its share of ups and downs but hasn't come close to experiencing the sort of sudden plunge in the value of its currency that dozens of countries have gone through since the early 1980s.

⌚ What might cause a big fall in the demand for baht? In the market for baht, there are basically 3 sources of demand:

1. people who want to hold Thai baht currency because they want to buy Thai products, such as rice or manufactured goods;
2. people who want to buy Thai assets, such as stocks or bank deposits; and
3. speculators who want Thai baht simply because they think the price of the currency will increase.

⌚ Each of these groups is holding US dollars with which they could buy Thai baht. A fall in demand for baht would occur because demand for Thai products falls, demand for Thai assets falls, or speculators no longer think the baht will increase in value.

⌚ Any of these 3 groups could be the main force behind a change in the demand for baht, but generally the second group—external investors—has the most resources. Millions of investors with hundreds of billions of dollars in savings are looking for attractive places to invest their funds.

⌚ In fact, the amount of saving globally is much greater than the trade in goods and services or the amount of money that goes into currency speculation. So, in general, investors are behind most of the big currency moves that take place.

⌚ But the supply side of the market is also important. The suppliers of baht include anyone who is holding the Thai currency and wants to sell it for US dollars, including

1. companies that want to import products from the United States and need dollars to buy those products;
2. investors who are holding Thai baht and want to buy US assets (who might be Thai citizens but could also be foreign investors who bought Thai assets in the past and now want to sell their investments in Thailand and move the money back to the United States); and
3. speculators who are holding Thai baht but anticipate that its value will fall and want to exchange it for dollars before that happens.

- ⌚ The largest of the 3 supply groups is often again the investors, because it includes Thai citizens who wish to invest in the United States and foreign investors who wish to move money into US assets. So, one of the main ingredients of most currency crises is a large change in investor sentiment regarding a country's assets.
- ⌚ Investors who were thinking about investing in a country—and would have demanded to buy its currency—change their minds, causing demand for the currency to fall. On the other side of the market, investors who have already invested in the country's assets now have second thoughts and want to sell their assets, convert their currency holdings into dollars, and invest the money in the United States instead.
- ⌚ A change in investor sentiment can significantly drive the demand for a currency down and the supply of the currency up.

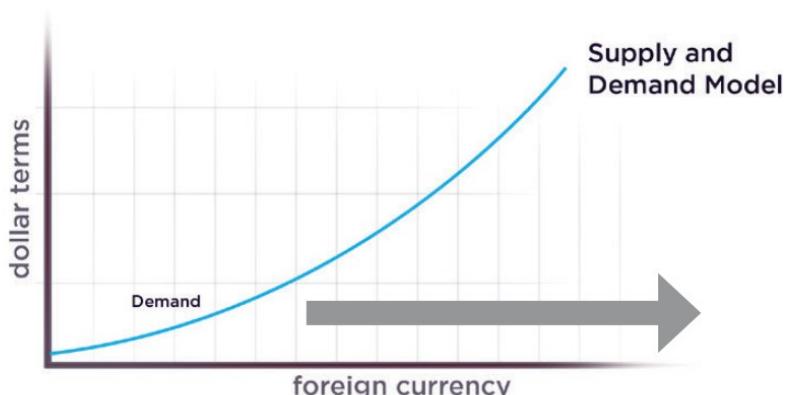
CHANGES IN A CURRENCY'S VALUE

- ⌚ What causes investors' attitudes toward a country's assets to change so much? The short answer is that it depends on the asset, but there are really only 2 main types of assets to consider: government and private.
- ⌚ Government assets are government bonds. Sovereign debt, as it's called, is very popular among international investors. Government bonds are generally safer than private-sector assets, such as corporate bonds, bank deposits, or stocks. But foreign governments can—and do—default on a regular basis.
- ⌚ The ability of a government to repay its debts is called debt sustainability by economists, and it's proved to be very difficult to measure or predict. Investors and economists know that the ability to repay is affected by the government's fiscal condition—that is, whether it's taking in enough taxes or other revenue to cover its spending. But it also depends on the total amount that the nation has already borrowed.
- ⌚ Some countries seem able to run big deficits and borrow huge amounts without disturbing the markets. Japan and the United States are examples. Investor confidence appears to be a big factor in determining whether a given country's debt is sustainable. The problem is that investor confidence can evaporate without warning.

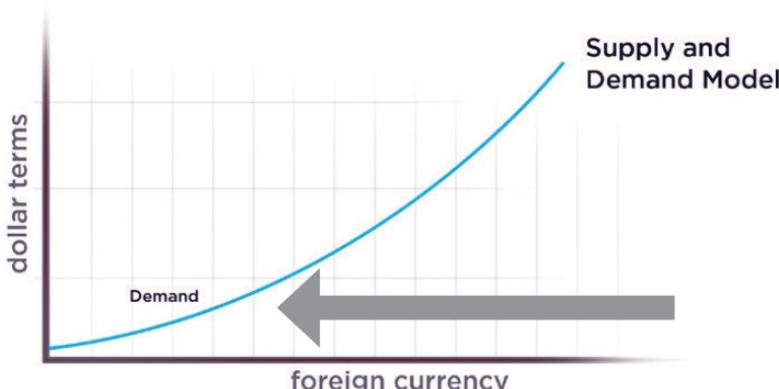
- ⌚ Private assets can be just as tricky as government debt, if not worse. When an economy performs well or asset prices start to rise, then international investors will take note and move money into the country to take advantage of these opportunities. They might buy corporate bonds and stocks directly.
- ⌚ But in many cases, they will be enticed by the country's currency itself and high deposit rates at the country's large banks. Depositing money with one of the largest banks in a country can seem safer because the banks are typically big institutions and may appear to be implicitly backed by the government.
- ⌚ In addition, it can be more convenient for an international investor to deposit cash in a bank at a high rate of return and let the bank decide how to lend the money out, because the bank should know the companies in the country very well.
- ⌚ But if those private investments don't live up to expectations—or worse, start to go bad—it can all unravel in a hurry. Investors might want to sell off their stocks and bonds or withdraw their deposits as quickly as they can and then move the money to another country with better prospects.
- ⌚ Sometimes, the people who are selling the most assets are actually local citizens. After all, these people might have better information about the true financial condition of the government or the companies in the economy. And they may also have more to lose because a greater fraction of their wealth is likely to be invested in their home country.
- ⌚ In many currency crises, foreign investors don't actually run for the exits but simply stop investing more, economists have found. But a sudden drop in foreign investment can still place significant downward pressure on the value of a foreign currency because of the large amounts of money involved.
- ⌚ Economists now believe that one of the most important causes of a currency crises is a sudden stop in investment inflows rather than a rush to the exits.

THAILAND'S CURRENCY CRISIS

- ⌚ A loss of faith in a country's assets is one of the main ingredients of a currency crisis. It does a pretty good job of explaining why currency values fall, but it doesn't guarantee that the speed of the fall will be very fast. Theoretically, the loss of confidence in a country's assets could be gradual, implying a gradual and extended drop in the demand for a currency and its value. Such a development can be hard on a country over time, but it's not really a currency crisis.
- ⌚ But an important ingredient is still missing: an overvalued currency. This might seem odd, because we've been thinking about the exchange rate as the equilibrium price of a currency in terms of dollars. It's a market price. And in simple models, the market price is always right—or it's right unless there's some hidden interference in the market.
- ⌚ With exchange rates, there's often some government interference hidden in the demand curve for the currency. In other words, governments often pump up demand for their currency by buying it up in the market.
- ⌚ For the Thai baht, the demand curve is made up of people who are currently holding US dollars but wish to buy Thai baht, so if Thailand's central bank—the Bank of Thailand—holds dollars, it can spend them to purchase baht. Whenever it intervenes in the market this way, it pushes the demand curve for baht to the right and raises the equilibrium exchange rate.

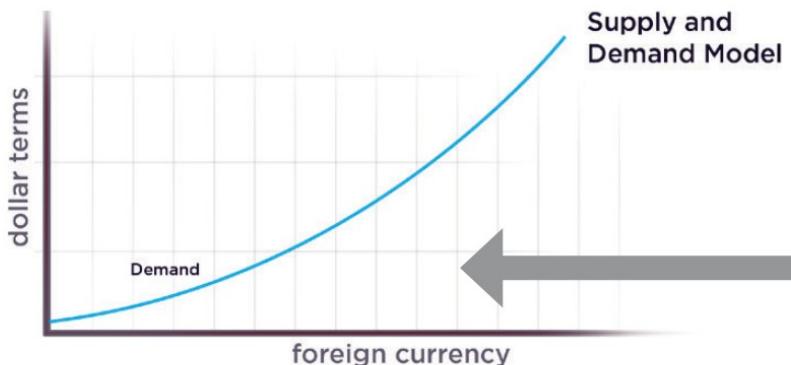


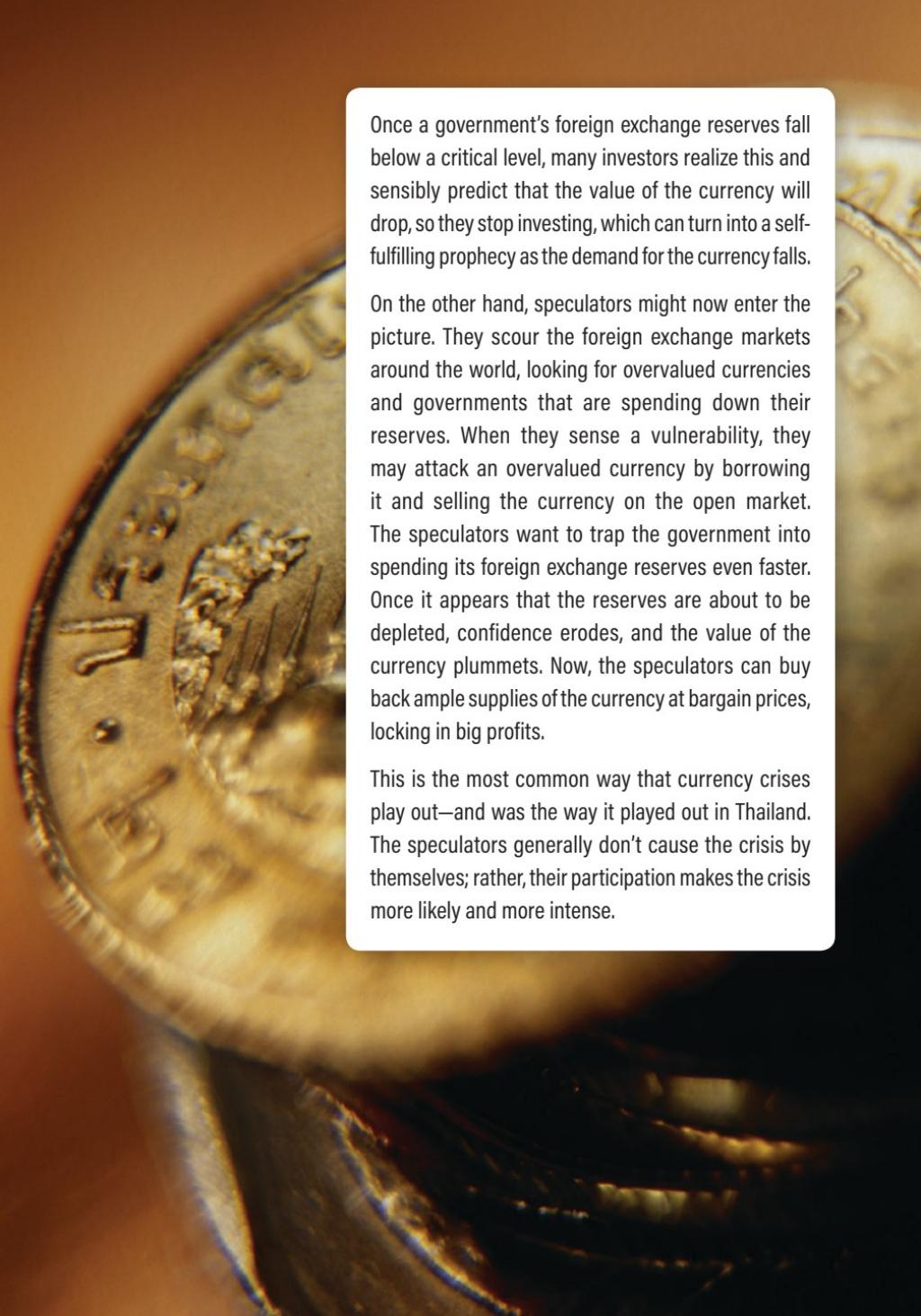
- Without the government's intervention, the demand curve wouldn't have moved and the value of the baht would remain lower. So, the difference between where the demand curve is with the government purchases of baht and where it would be without these purchases implies a difference in value that we can attribute solely to the government's intervention.
- That's how we can say that the exchange rate is overvalued, even though we think the market is in equilibrium. If it weren't for the government's purchases of its own currency, the demand curve would move to the left and the equilibrium value of the currency would be lower.



- Why would a government intervene in the currency market like this? One possibility is to help its own citizens, even if indirectly. First, the higher the value of the baht, the cheaper its imports will be. This helps the citizens of Thailand directly and also benefits Thai companies by making imported inputs cheaper. Thus, in many cases, the exchange rate overvaluation is the result of the government trying to hold down the cost of living when many of its products are imported.
- On the other hand, many governments unintentionally overvalue their currency by trying to hold the value stable over long periods. Foreign customers who buy Thai exports find it more attractive to deal with Thai companies if they don't have to worry about the exchange rate bouncing around all the time, so the government tries to hold the exchange rate stable to benefit its exporters—and, in turn, the people who work for them.

- ⌚ But over time, as the Thai economy matures and changes, the old exchange rate may no longer be the right one. As economies mature, they tend to become less competitive. Wages increase and all the highest-returning projects are already under way or complete. This leaves only lower-returning projects to invest in.
- ⌚ So, the foreign demand for Thai products and for Thai assets may tend to fall as the economy grows and matures. In this case, the value of the Thai baht should fall, too. But the government might remain committed to its old exchange rate and prevent the value of the currency from falling by starting to purchase baht.
- ⌚ If so, the longer the government holds the exchange rate stable, the more overpriced its goods and assets will become. Over time, the government has to buy more and more of its own currency to support its target exchange rate. And this can go on for only so long.
- ⌚ The Bank of Thailand can buy up baht only as long as it has a stock of dollars to spend. This stock of foreign currency held by the Bank of Thailand is referred to as a country's foreign exchange reserves. When the foreign reserves are depleted, the bank no longer has the cash resources to buy baht, and the intervention must end.
- ⌚ When a government that has been pumping up the demand for its currency runs out of reserves, the extra demand that the government had been providing suddenly disappears, and the demand curve immediately shifts to the left. This means that the equilibrium exchange rate has to fall virtually instantaneously. And the more government support was needed to hold up the old exchange rate, the further the value of the currency will fall.





Once a government's foreign exchange reserves fall below a critical level, many investors realize this and sensibly predict that the value of the currency will drop, so they stop investing, which can turn into a self-fulfilling prophecy as the demand for the currency falls.

On the other hand, speculators might now enter the picture. They scour the foreign exchange markets around the world, looking for overvalued currencies and governments that are spending down their reserves. When they sense a vulnerability, they may attack an overvalued currency by borrowing it and selling the currency on the open market. The speculators want to trap the government into spending its foreign exchange reserves even faster. Once it appears that the reserves are about to be depleted, confidence erodes, and the value of the currency plummets. Now, the speculators can buy back ample supplies of the currency at bargain prices, locking in big profits.

This is the most common way that currency crises play out—and was the way it played out in Thailand. The speculators generally don't cause the crisis by themselves; rather, their participation makes the crisis more likely and more intense.

CURRENCY CRISIS IN GREECE

- ⌚ A more recent example of a currency crisis is that of several southern European countries that used the euro as their common currency, including Greece. This one bore all the symptoms of a classic currency crisis but couldn't end the same way because the value of the euro is based on the overall financial strength of the economies that use it as their currency—which encompass most of Europe. So, it's extremely unlikely that any single country could provoke a crisis in the value of the euro.
- ⌚ Still, the value of the euro was too high for Greece, making Greek products uncompetitive on international markets. Therefore, Greece exported too little and imported too much. To maintain its standard of living, the Greek government borrowed abroad, which led to excessive borrowing, culminating in a classic debt-sustainability problem that in other countries would probably have led to a currency crisis. But Greece was trapped inside the euro zone.
- ⌚ To make its debt sustainable again, Greece needed to cut government spending drastically, raise taxes, and reform its business regulations. But this is an extremely painful remedy because it results in severe recession and massive unemployment. It's also politically challenging, to say the least. Greece was stuck.

One lesson that comes out of this lecture is that we shouldn't assume that a currency crisis can't happen in the United States or other outwardly sound economies.

The combination of high government borrowing and a strong dollar—as in the US—isn't sustainable over the long run. One has to go: high borrowing or the strong dollar. And it would be better if we choose how and when to solve the problem, rather than have the market choose for us.



SUGGESTED READING:

Aziz, Caramazza, and Salgado, “Currency Crises.”

Lewis, ed., *Panic!*, part II.

Montiel, *Ten Crises*.

QUESTIONS TO CONSIDER:

1. Are the sources of currency crisis always to be found in a country's domestic economic policy? Or is the fatal error the choice to set and defend the wrong international value for its currency?
2. The US dollar plays a special role around the world as a so-called global reserve currency. You can find a discussion of this role at this link: <https://www.brookings.edu/blog/ben-bernanke/2016/01/07/the-dollars-international-role-an-exorbitant-privilege-2/>
3. This role is often cited as one of the reasons why economic policy makers in the United States tend to pursue a strong dollar policy, in which a high price of the dollar, in terms of other currencies, is a goal. Does the dollar's role as a reserve currency make a currency crisis in the US less likely? Does it make it virtually impossible?

THE ORANGE COUNTY, CALIFORNIA, BANKRUPTCY

LECTURE 17

Robert Citron was the treasurer and tax collector of Orange County, California, for more than 23 years. He was considered a superstar among state and county money managers because of the consistently high returns he earned. But he also seemed to be the kind of person who didn't want the government looking over his shoulder too closely, especially when it came to how he managed the Orange County investment pool. He reported to the county Board of Supervisors about the fund only once a year and overcame several organized attempts to impose more oversight on him. After all, people couldn't argue with Citron's success. But in late 1994, he suddenly disclosed massive losses on the Orange County investment pool, forcing the county to declare bankruptcy—the largest municipal default in US history up to then.

THE ORANGE COUNTY INVESTMENT POOL

- ⌚ Governments, like businesses, need to set up treasury accounts to help them manage the cash that flows into and out of the organization. The timing of the cash that a county government collects, such as sales taxes and property taxes, almost never matches up perfectly with the county's expenditure patterns.
- ⌚ Orange County's tax bill first comes due late in the year, which is also when people are doing a lot of holiday shopping that will contribute to the sales tax revenues that California collects on a quarterly basis.
- ⌚ Cash floods into county governments around the end of the year, but most county governments spend money at a much more even pace throughout the year. And all during that time, they also need to allocate funds to pay pensions and for big capital projects, such as repairing roads and bridges.
- ⌚ As a result, every county government needs to store its money in a safe place for months, and possibly even years, at a time until its bills come due. Like Orange County, many county governments establish investment funds designed to earn a higher return than they might get on a bank deposit account or in a money market mutual fund.
- ⌚ There are some very safe investments, such as longer-term government bonds, that can deliver higher returns with only a slight increase in risk—if the money manager follows a sensible investment strategy.

ENTER ROBERT CITRON

- ⌚ Robert Citron didn't have much formal training in economics or finance, but he did work for a private consumer finance company in the late 1950s called Century Finance, and this experience probably helped him land a job in the Orange County tax collector's office beginning in 1960. He built up a reputation as a hard worker and eventually rose to the position of supervisor in the tax collector's office.
- ⌚ When the Orange County tax collector retired in 1971, Citron ran for the position and was elected to fill the vacancy. In 1973, Orange County merged the tax collector's and treasurer's offices, making Citron the country treasurer.



Interestingly, Citron was a lifelong Democrat in a staunchly Republican county. Nonetheless, he was reelected 6 times. Citron's success as an investor had a lot to do with that, but he also showed some tendencies—mainly in his aggressive attitude toward deregulation—that would have pleased conservative Republicans.

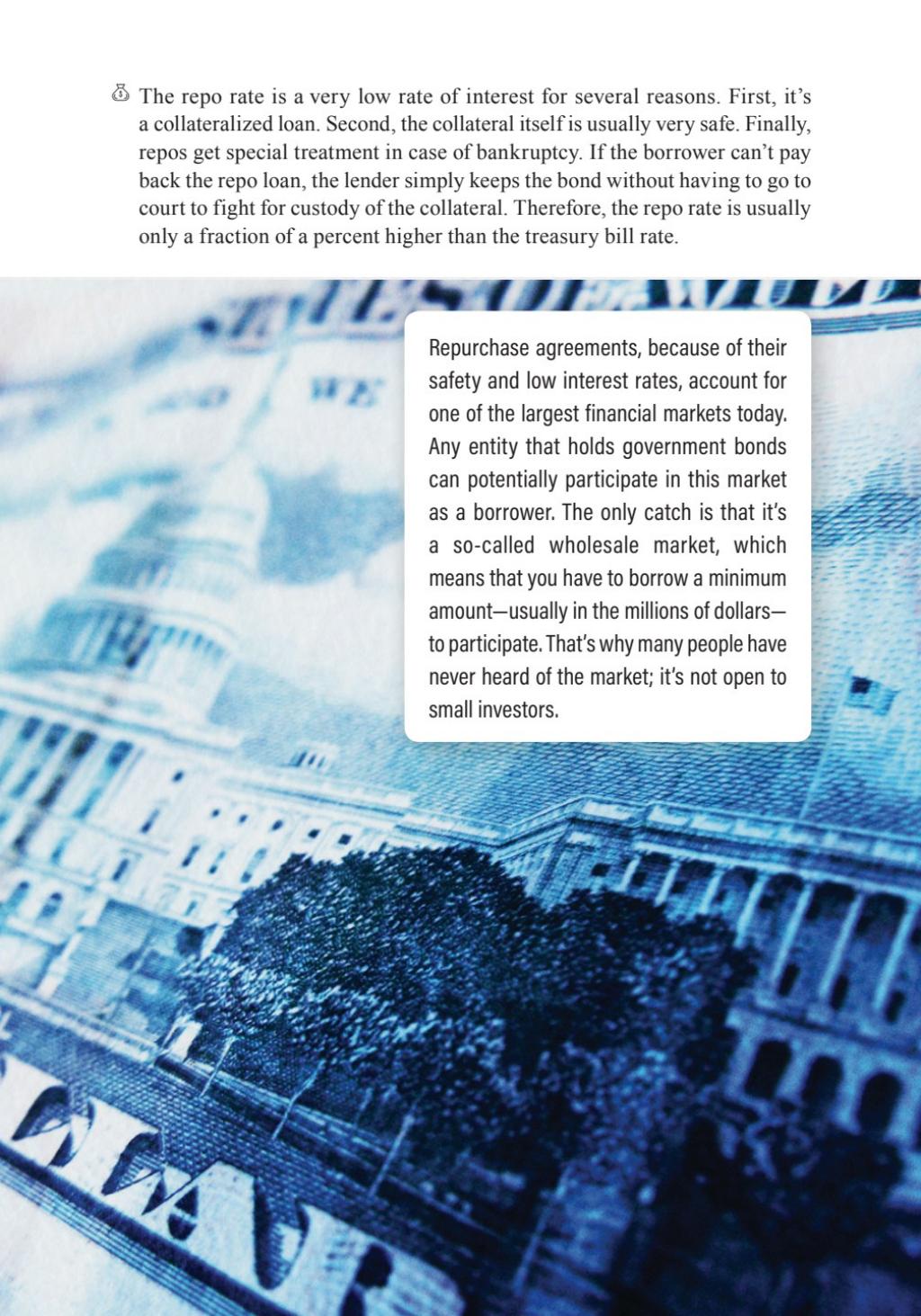
- ⌚ For example, in the late 1970s, Citron had played an important role in lobbying the California state legislature to allow county officials to invest in a wider range of financial instruments than just plain-vanilla bonds. The relaxed regulations play a key role in this story.
- ⌚ At the time, many California counties were reducing, or curtailing, services due to a 1970s-era ballot box initiative known as Proposition 13 that had restricted state property tax revenues. But Orange County could keep spending, in part because its investment fund generated extra income.
- ⌚ The returns on the Orange County investment pool were significantly higher than those on a similar investment pool operated by the state of California, which meant that Orange County earned hundreds of millions more on its pool than the state did.
- ⌚ Not surprisingly, the Orange County investment pool's returns increasingly drew attention. About 189 different public entities in Orange County—including 31 cities, local school districts, and water and sanitation authorities—all invested with Citron through the Orange County pool. Even some municipalities from outside of Orange County asked to be allowed to invest in the pool. Some local governments borrowed money so that they could boost their investments in the Orange County pool.

- ⌚ In 1988, Citron was named one of the top 5 financial officers in America by *City & State* magazine. And by 1994, the amount invested with him had increased to \$7.4 billion.

REPOS: THE SECRET BEHIND CITRON'S SUCCESS

- ⌚ In his early days, Citron didn't actually need that much skill. Interest rates were on the rise during the 1970s as inflation became a bigger and bigger problem. So, if Citron simply invested in short-term money market instruments like treasury bills, his returns would have increased steadily through the decade, reaching double-digit levels by 1980.
- ⌚ But interest rates peaked after that and then began a long decline. This would have dragged down the returns on the Orange County funds, as interest rates fell back to normal levels. By this time, Citron must have learned enough on the job to favor a new investment strategy from Wall Street designed to profit from falling interest rates. And for a while, it worked great.
- ⌚ To understand what he did, we need to examine a financial instrument that shows up everywhere in the financial markets these days but is invisible to most individual investors: a repurchase agreement, or repo, in which one party sells an asset to another party but at the same time agrees to buy it back at some point in the future at a higher price. The second part of the agreement—the commitment to buy back, or repurchase, the asset—is where the name “repo” comes from.
- ⌚ A repo can be written for any asset, but the most common asset for a repo is a high-quality bond, such as a government bond. In a typical agreement, one party sells a government bond to another today and commits to buy the bond back later at a higher price. This might seem like a crazy thing to do, but in actuality the repo is nothing more than a short-term loan.
- ⌚ The role played by the government bond is important. It's the collateral on the loan. The party that sells the bond and buys it back later is actually a borrower who uses the bond as collateral for the loan.
- ⌚ The interest on the loan is the difference in the price the borrower receives for the bond when he or she sells it and the price he or she pays the lender when buying it back. The interest rate on the repo loan is determined by the repo market and is called the repo rate.

- ⌚ The repo rate is a very low rate of interest for several reasons. First, it's a collateralized loan. Second, the collateral itself is usually very safe. Finally, repos get special treatment in case of bankruptcy. If the borrower can't pay back the repo loan, the lender simply keeps the bond without having to go to court to fight for custody of the collateral. Therefore, the repo rate is usually only a fraction of a percent higher than the treasury bill rate.



Repurchase agreements, because of their safety and low interest rates, account for one of the largest financial markets today. Any entity that holds government bonds can potentially participate in this market as a borrower. The only catch is that it's a so-called wholesale market, which means that you have to borrow a minimum amount—usually in the millions of dollars—to participate. That's why many people have never heard of the market; it's not open to small investors.

- ⌚ Repo loans are classified as money market instruments because they usually have short maturities. Most repos have overnight, or 1-day, maturities. But many, if not most, repo loans get rolled over on a daily basis. There are also many repo loans that have maturities up to several months. There are even so-called open repos, which are set up to go until one side or the other wants to end the agreement. Citron often used this latter type of repo.

CITRON'S INVESTMENT STRATEGY

- ⌚ Citron took the money that came into the Orange County investment pool and bought long-term government bonds with much of it. He did this for 2 reasons: Long-term government bonds carry higher interest rates than treasury bills, so he'd be earning a higher interest rate; and he then entered into repos using the government bonds as collateral.
- ⌚ In other words, Citron was leveraging his bond investments. He invested in government bonds and then used them as collateral to borrow still more money. Citron was using leverage—borrowing—to increase the returns on his portfolio of bonds. He was allowed to do this because repos were one of the instruments that he'd specifically lobbied the state legislature for permission to use.
- ⌚ When someone sells his or her government bonds as part of a repo, he or she is still entitled to the interest payments on that bond. Even though Citron entered into repos using the long-term bonds he had bought for the pool, he still received the interest payments on them.
- ⌚ With the money he borrowed, he bought more bonds—specifically long-term bonds, which paid much higher interest than the repo rate. So, Citron was borrowing money at the repo rate and earning the higher long-term interest rate on the bonds he bought with that money. This difference in interest, or spread, represented extra interest that he was earning on top of the interest that he was still receiving on the initial set of bonds he had bought.
- ⌚ But that wasn't enough for Citron. He actually took the second batch of bonds he bought and did the same thing again: He entered into repos that enabled him to borrow more money using those bonds as collateral and bought a third set of bonds with the cash.

- ⌚ Thus, although the county had contributed \$7.4 billion to the fund, it was actually leveraged to hold close to \$20 billion worth of bonds in the fund. Through the use of repos, Citron borrowed \$2 for every dollar invested by the county and used those dollars to buy more bonds.
- ⌚ When interest rates are falling, this investment strategy is a big winner. In terms of the interest rate, the spread, or difference in interest, between the bond rate and the repo rate will get larger as interest rates fall.
- ⌚ The fund will also realize a capital gain if interest rates fall. That occurs because eventually Citron will have to sell the bonds that he bought with the repo money so that he can repay the repo loans. Generally, bond prices rise as interest rates fall, so if interest rates fall between the time he buys the bonds and sells them, then the price of the bonds will rise above the price that Citron originally paid for them, generating a profit on the sale.
- ⌚ Thanks to the roughly 3-to-1 leverage that Citron achieved through the use of repos, the Orange County investment pool earned high returns even when interest rates stayed the same. And if rates fell, the fund earned more money through an increase in interest income and on capital gains. This goes a long way toward explaining why Citron was able to achieve such high returns and beat other municipal fund managers around the country.
- ⌚ But Citron also used another tool: a special bond called an inverse floater. A floating-rate bond, or floater, makes interest payments that change as the market interest rate changes. Generally, a floater will adjust its interest rate every 6 months because most bonds make interest payments this frequently. Therefore, as the market interest rate increases, the interest rate on the floater increases.
- ⌚ But the interest payments from inverse floaters decrease, not increase, as interest rates rise. The terms of floating-rate bonds with inverse floaters are usually spelled out by a simple formula that starts with a relatively high fixed interest rate and then subtracts the current 6-month market rate. An inverse floater gives investors a simple way to make a bet on the direction of future interest rate changes.

- ⌚ Using an inverse floater to borrow is a great way to hedge against rising interest rates because the borrower's interest expenses actually fall as interest rates rise. But who would want to buy inverse floaters? Investors who believe that interest rates are going to stay the same, or fall, will buy them. If interest rates fall, then the interest payments on the inverse floater increase.
- ⌚ Citron bought a lot of inverse floaters for the Orange County investment pool—almost \$600 million worth—because he was convinced that interest rates would continue to fall. And up through 1993, he was right. Not only was inflation falling and driving interest rates down, but the Fed did some aggressive interest rate cutting in the early 1990s to stimulate the economy.

A DEVASTATING SURPRISE FOR CITRON

- ⌚ Then, in early 1994, the Fed started to get worried that inflation was on the rise, so it began what turned out to be an especially aggressive series of interest rate increases. The rate hikes were more numerous and more frequent than the markets had expected, and this turned out to be a devastating surprise for Citron and the Orange County investment pool.
- ⌚ As interest rates rose, Orange County's interest income earnings fell, because the spread between the long-term bond rate and the repo rate shrank. In fact, for some of Citron's holdings, the repo rate rose above the long-term bond rate that he was earning on the bonds, so he started to incur big losses.
- ⌚ In addition, the fund began to record capital losses when it came time to sell the bonds and repay the repo loans because the long-term interest rates were rising. To top it all off, the interest earned on Citron's inverse floaters was falling significantly. And it turns out that Citron didn't invest in regular reverse floaters but, rather, a special kind whose interest payments fell twice as fast as interest rates rose, called step-up double inverse floaters.
- ⌚ Thus, as the Fed raised interest rates throughout 1994, the interest income earned on the Orange County investment pool fell dramatically. And to make matters worse, Citron remained adamant that interest rates would reverse course and decline again.

- ⌚ Putting his money where his mouth was, he spent a significant amount of the remaining free cash in the county investment fund on more long-term bonds, effectively doubling down after his earlier bet lost money.
- ⌚ Remember that the main purpose of the investment pool was to serve as the county's checking account, and as interest income was plummeting, the county still had bills to pay.
- ⌚ Citron didn't want to sell investment pool bonds because this would lock in any losses—which so far existed only on paper. But the county's main source of cash was now drying up. Citron thought that if the fund could survive until mid-December 1994, when the bulk of the property tax payments came in, this would buy sufficient time for rates to fall again.
- ⌚ But the investment banks that had entered into the repos with Orange County became nervous about the county's ability to pay back the repo loans, and in November 1994, several of them refused to roll over their outstanding repo loans and demanded immediate repayment. That signaled the end.
- ⌚ The Orange County Board of Supervisors announced on December 1 that the investment pool's value had declined by more than \$1.5 billion and asked Citron to resign. He resigned on December 4.
- ⌚ The county tried to find buyers for its pooled investments, but nobody wanted them. Instead, Orange County filed for bankruptcy on December 6. A big reason why it declared bankruptcy was to prevent the banks it owed from liquidating its assets—including the repo collateral.
- ⌚ In a typical bankruptcy, a judge will issue a stay that prevents creditors from seizing and liquidating the filer's assets to provide time for an orderly workout. And that certainly applied to many of the county's physical assets, such as buildings and equipment, but remember that a repo is exempt from those rules.
- ⌚ The banks that had made the repo loans now insisted on the right to liquidate the repo collateral without going to court and proceeded to do so. Within a short amount of time, they had sold off more than \$11 billion worth of bonds held as repo collateral at a realized loss of more than \$1.3 billion.

The actual amount of money invested in the pool had been \$7.4 billion, so that was a huge loss.

- ⌚ In all, when the portfolio was completely liquidated and the 189 county organizations that had invested in the fund were paid off, they received only about 77¢ on the dollar.
- ⌚ The county now sued the investment banks that had sold it the inverse floaters and repos, such as Merrill Lynch. The banks settled out of court, despite the fact that there were documented warnings from several of them urging Citron to change his investing strategy in 1993 and 1994.
- ⌚ In all, the county received \$400 million from Merrill Lynch and more than \$800 million from the institutions it sued, which was close to half of its total losses. After some spending cuts and negotiations with bondholders, Orange County emerged from bankruptcy in 1996.
- ⌚ For his part, Citron pleaded guilty to 6 felony counts of misappropriating public funds, falsifying documents, and misleading the government agencies that had entrusted their funds to the investment pool he oversaw. He was sentenced to 1 year in jail but served 8 months in a work release program and received a \$100,000 fine.
- ⌚ The state of California reacted to the county's bankruptcy by tightening many of the regulations that Citron and others had persuaded it to loosen more than a decade earlier. In particular, the legislature strictly limited the amount of leverage that governmental fund managers could use and banned the use of securities like inverse floaters by state and local government money managers.
- ⌚ Orange County went a step further and prohibited the use of any leverage in its municipal investments. In addition, the state imposed minimum education requirements on its county treasurers and put in place minimum financial reporting standards for municipal investment funds, such as quarterly financial statements.



One lesson that this case illustrates is the need for active and thoughtful oversight of governmental money managers and traders.

SUGGESTED READING:

Jacque, *Global Derivatives Debacles*, chap. 14.

Jorion, *Big Bets Gone Bad*.

QUESTIONS TO CONSIDER:

1. Is there any way to allow fund managers to use instruments like repurchase agreements while preventing them from speculating with them, as Citron did? For example, would it be possible to limit the amount of leverage that a fund manager uses? How do mutual funds do this?
2. Is the fundamental problem behind the pension fund losses in Orange County the investment strategy followed by Citron, or was the problem the lack of transparency? In other words, if Citron would have been forced to be more transparent about the pension fund's holdings, do you think this would have been sufficient to prevent the problems you learned about in this lecture?

THE DOTCOM BUBBLE

LECTURE 18

The dotcom boom signaled a fundamental and permanent change taking place in the economy. One consequence was that it made the job of valuing companies more difficult than it already was. The realization that the internet had opened up tremendous new business opportunities—combined with uncertainty about how to put a reliable dollar value on what amounted to a land rush—opened the door to overvaluation and speculation. Several types of bad behavior in the market also helped propel stock prices from high to absurd and then sublime.

THE START OF THE INTERNET STOCK BOOM

- ⌚ The World Wide Web, which went live in August 1991, along with the web browser Netscape Navigator, which was launched in 1994, brought a business-friendly platform to the internet that gave people a convenient way to buy and sell goods and services, including access to content that they made. This meant that some people were about to get rich, either by starting new companies or by investing in them.
- ⌚ Netscape's initial public offering (IPO) in August 1995 is considered by many to be the start of the internet stock boom. Netscape's path from privately held company to publicly listed and traded corporation was, in many respects, the model for just about every subsequent internet stock offering.
- ⌚ Not long after its founding, Netscape secured venture capital funding to develop and market the browser product. After its second round of venture funding in early 1995, the company was valued at more than \$150 million. And with each subsequent round of funding, the company's valuation rose higher.
- ⌚ Like many internet start-ups that came after it, Netscape was taken public on an accelerated schedule. Prior to the internet boom, it had been common for a decade or more to pass before a company was believed ready to issue publicly traded shares and list on an exchange. But in the case of internet companies, this was shortened considerably, for 2 reasons:
 1. The growth in the usage of the company's product was exponential, and this excited investors.
 2. Internet company founders and early investors frequently wanted to put their shares on the market before their ideas were scooped up by competitors. This sense of urgency became a distinguishing feature of the dotcom boom.
- ⌚ Netscape's founders were really scared by the possibility that Microsoft would build its own browser, so their idea was for Netscape to grab as much market share as possible before Microsoft attacked with its own product.

The internet grew out of a communications network, the Advanced Research Projects Agency Network (ARPANET), created by the US Department of Defense in the 1960s.

One of the most extraordinary stocks of the dotcom boom is Amazon, which went public in May 1997 at \$18 per share. Company sales of \$16 million in the first quarter of 1997 surpassed the entire previous year's revenues on the way to more than \$100 million for all of 1997. By the end of 1998, Amazon's sales were more than half a billion, and the market really started paying attention.

After a 2-for-1 stock split, Amazon shares climbed above \$100 by the end of June 1998 and past \$200 in November. The stock rose above \$300 in December after internet stock analyst Henry Blodget announced a price target of \$400 per share. At that point, Amazon had a market value 8 times that of its brick-and-mortar competitor Barnes & Noble without having earned a cent of profit. In fact, the more it sold, the faster its losses rose.

- ⌚ Netscape picked star investment banker Frank Quattrone to handle its initial public offering. Institutional investors expressed such great interest in buying Netscape shares that the offering price doubled from \$14 to \$28 a share, and on the day of Netscape's IPO, the shares were off the charts by the standards of the time—rising from \$28 to \$58.25, a gain of almost 110%—and valued Netscape Communications at \$2.2 billion.
- ⌚ The essential pattern that Netscape established was that after a brief period of corporate development with venture capital funding, an internet startup would choose a superstar investment banker to shepherd the company through the IPO process. The shares would experience a healthy pop, implying a total value ranging from hundreds of millions to billions of dollars for a company that was usually losing millions of dollars. And from there, the shares would continue to climb, regardless of whether the company turned a profit.

THE VALUE OF INTANGIBLE ASSETS

- ⌚ The key to explaining the seemingly absurd market valuations associated with dotcom companies is to understand—and appreciate—the value of intangible assets, which are productive assets that often can't be seen or touched but are nonetheless real.
- ⌚ For example, brand names and company reputations are intangible assets. Intellectual property, such as trade secrets, patents, and business methods, is also an intangible asset. Even technology can sometimes be an intangible asset.
- ⌚ Intangible assets add value to a company by giving it a competitive advantage. Some intangible assets—such as the patents that pharmaceutical companies own—grant explicit monopoly rights. But some intangible assets give companies market power that works the same way. For example, the strong brand name of BMW enables the car company to charge a premium based on its reputation.
- ⌚ Other intangible assets might improve efficiency and cut costs in ways that other companies can't match. For example, Walmart's purchasing and distribution systems are believed to make the company more efficient

than other retailers, enabling it to charge lower prices and still earn higher profits than its competitors.

- ⌚ The share of a company's value attributable to intangible assets has been increasing over time as the economy evolves. This helps us understand how, and why, the increasing value of intangible assets that companies owned—and the increased reliance on intangible assets to create value—contributed to an increase in stock prices in the early 1990s.
- ⌚ For example, globalization added to the values of brand names by expanding the markets that companies could reach. And the use of personal computers increased the efficiency of individual workers, lowering costs for those companies that could make the best use of them. The increasing importance of software as a product is a perfect example of the increased reliance on intangible assets.
- ⌚ The dotcom companies took the idea of intangible assets to an extreme because they were companies that consisted mostly—if not completely—of intangible assets. Some online retail sites, such as Amazon, needed physical warehouses or fulfillment centers, but others, such as eBay, did not. Search engines, internet portals, and site-hosting services existed exclusively online.
- ⌚ As these companies attracted more and more visitors to their websites, people recognized that their intangible assets had the potential to create tremendous growth. First, the number of users or customers increased as more and more people gained internet access. And more importantly, some sites would naturally become dominant.
- ⌚ This might occur because they were better, faster, or cheaper than everyone else. But other dotcoms would become dominant simply because they were the first to provide a certain product or service. People would develop the custom of using that site and continue to choose it even after competitors entered the market.
- ⌚ In other words, the internet economy was initially thought to be a set of winner-takes-all markets, in which the top firm would account for 80% or more of the transactions in each market.

Part of the attraction of the winner-takes-all model was that a recent historical example appeared to prove its relevance to technology investing. There was a personal computers stock boom in the 1980s, when hundreds of companies started producing IBM PC clones. And many of these firms went public.

If you invested in these companies—as long as one of the stocks you bought was Dell—then you would have made a lot of money. Your gains on Dell would have been more than sufficient to make up for the losses you might have suffered on the other companies.

The lesson that stuck with people is that you should buy a little of everything to ensure that you held the eventual winner. This strategy encouraged people to buy even the craziest dotcom stocks.



THE DIVIDEND DISCOUNT MODEL

- ⌚ Because expected future growth is one of the main ingredients of stock valuation, investors focused on the growth potential of the dotcom stocks to justify the prices they were paying. The standard dividend discount model of stock valuation says that $P = D/(r - g)$, where P is the price of a stock today, D is its next dividend, r is the stock's discount rate, and g is the growth rate of its dividend.
- ⌚ The discount rate is the rate of return that an investor should expect to earn on a particular stock, given the potential earnings and the riskiness of the company. The higher the dividend growth rate is, the smaller the denominator of the fraction becomes, and the higher the price of the stock.

- ⌚ Companies like Amazon provided convenient and cheap new ways to buy goods and services or even entirely new services that people didn't know they needed or wanted until now. And the belief that these new products and services would deliver tremendous rates of growth are what convinced the early investors in dotcoms to put their money into companies like Netscape.
- ⌚ Unfortunately, people were so infatuated with the growth part of the equation that they overlooked the other 2 parts of the dividend discount model, beginning with the dividend (D).
- ⌚ For the model to work correctly, the company has to have a profit that it can pay out as a dividend. But most dotcom retailers believed that they needed to attract customers first by offering low prices and doing a tremendous amount of advertising. So, they basically lost money on every order. Most of the dotcom companies that weren't retailers—especially internet portals and online communities—didn't really have a revenue model at all.
- ⌚ Charging subscription fees didn't work very well, at first, because there were too many sources of free content springing up all over the web. And there was a strong ethos among the early internet community that everything on the web should be free.
- ⌚ These companies mostly ended up following the radio and television model of selling advertising on their sites. Yahoo was an early leader, placing banner ads on its pages. But the ads weren't very effective at enticing people to click on them to be taken to the advertiser's website, let alone to buy something there.
- ⌚ Still, dotcom defenders had an answer to the dividend issue: We're in the early days of the internet, and many companies are going up a pretty steep learning curve. But if we project into the future, after the good companies learn how to make money and the bad ones drop out of the market, then our company will be making good profits. So, ignore the next 10 years and focus on how the company will be doing after that, when we think it will be profitable. Then discount those profits back to the present to arrive at a value for the company.
- ⌚ The consulting firm McKinsey & Company published an article in 2000 describing this method and used it to justify Amazon's market price at the time.

- ⌚ Even if the dotcom enthusiasts believed that their investments would eventually be profitable and pay dividends, they still ignored another key variable in the dividend discount model: the discount rate (r). Dotcom investors either didn't worry about what the correct discount rate should be, or they argued that it should be smaller for dotcoms than for old-economy companies. Because the discount rate reflects risk, technology should make the rate fall, leading to an increase in stock prices.
- ⌚ But we have to go back to the idea of intangible assets to figure out the discount rate for the dotcom companies. While some intangible assets create a lot of value, we also have to be careful about their true risk. One weakness of intangible assets is that they are fragile. Their value can erode, or collapse, without warning.
- ⌚ For example, Netscape's value dropped rapidly once Microsoft—as expected—put out a solid version of its web browser, Internet Explorer. That was the end of Netscape as an independent company, and basically the end of its browser.
- ⌚ Intangible assets can be quite risky—much more so than physical assets, such as factories or machines. And because dotcom companies were mostly made up of intangible assets, they probably should have been assigned much higher discount rates than were figured for other companies.

DOTCOMS: DESTINED TO FAIL

- ⌚ Several prominent business authorities warned the public that many dotcoms were destined to fail. But people just didn't seem to believe it. Many investors seem to have embraced the concept that the dotcom companies should grow first and then figure out how to turn a profit on all the business they were doing.
- ⌚ As stories of internet millionaires, huge first-day pops, and record closing stock prices became more common, it started to look absurdly easy to get rich from investing in dotcoms. And millions of people were game to try. This is the classic recipe for speculation-driven bubbles.
- ⌚ Millions of investors took part in the dotcom boom through their mutual funds, especially individual retirement accounts and 401(k) plans.

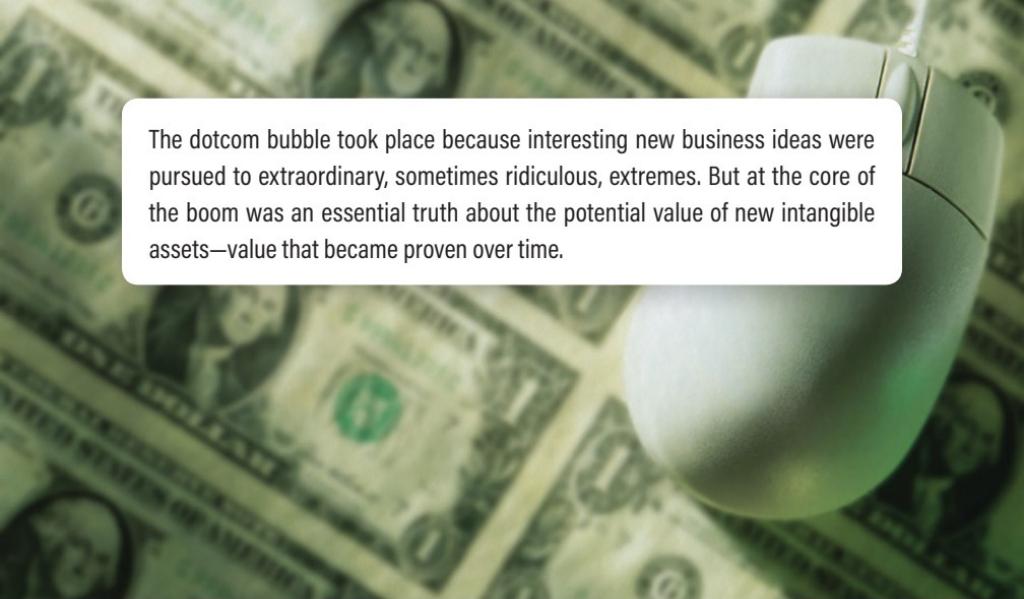
But the real money to be made was from getting in on a dotcom's IPO, collecting that first-day pop, and scoring even higher profits if the stock really took off.

- ⌚ People were clamoring for chances to take part in IPOs. And Wall Street was doing its best to provide as many company launches as it could. Taking dotcoms public became a highly lucrative business for the investment banks, starting with the underwriting fees associated with it. Wall Street's cut on each IPO was 7% of the money raised, which could turn into a whopping payday.
- ⌚ Because most dotcoms were still losing lots of money when they went public, they inevitably had to issue more shares or turn to the bond markets to fund operations. So, the investment bank underwriters would collect further fees from the follow-up stock and bond offerings that they underwrote for their clients.
- ⌚ Interest in dotcom stocks was sustained by the banks' stock analysts, who became celebrities in their own right. Although their recommendations were supposed to be independent, it was later discovered that some research analysts played a key role in attracting and retaining customers for the investment banks' underwriting services. They were compensated for helping bring in underwriting business, and their positive recommendations became part of the banks' strategy to both attract and retain dotcom clients who used the banks' services.
- ⌚ Over time, they came to issue virtually no sell recommendations, even as their optimistic characterizations helped convince millions of investors to buy shares of dotcom companies that they might otherwise have avoided. And this helped to further inflate the bubble.
- ⌚ It wasn't just Wall Street that was profiting from the dotcom companies; an entire economic ecosystem sprang up to nurture them. Many companies that benefited were in the technology area, selling servers and services

Between early 1991 and the Netscape IPO of August 1995, the Nasdaq composite gained 500 points, doubling its value. It then gained another 1000 points over the next 3 years, topping the 2000-point mark by the end of 1998. The next 1000 points only took 10 months to achieve. And the index would go on to gain another 2000 points early in the year 2000, peaking at just above the 5000 level.

that enabled the dotcoms to grow their online businesses. But the range of beneficiaries also went far beyond the technology industry. For example, law firms began to add staff to meet the dotcoms' legal needs.

- ⌚ The internet craze sparked a bubble throughout the general economy in 1998 and 1999. The growth rate of US gross domestic product rose above 3% and, for a few quarters, was almost 5%. America hadn't experienced that kind of growth for decades. The news persuaded many people that we were in a "new economy" and that it was reasonable to keep buying dotcom shares, no matter how far-fetched their business models seemed.
- ⌚ But company organizers and other investors found they had to keep pumping money into these start-up companies even after their IPOs. The cash infusions not only kept the companies alive, but also sustained the illusion that they would eventually grow into large and profitable enterprises that justified their sky-high prices.
- ⌚ In early 2000, investors started to hit their limits. It was becoming evident that too many start-up companies had been taken public too early in their development, without proven business models or, in many cases, even revenue models. In many lines of business, there were simply too many competitors trying to do the same thing. It was time to start cutting losses.
- ⌚ As a result, further investments were curtailed, and some big companies that had announced plans to buy dotcoms canceled the purchases. Some IPOs in the pipeline were postponed or canceled altogether. Many of the affected companies started to cut their expenditures. But for most of them, cost cutting put off the end by only a few weeks or months.
- ⌚ The Nasdaq composite peaked at just above 5000 points in March of 2000. One year later, the index had fallen below 2000, giving up 60% of its peak value. Although stock market crashes generally don't directly cause recessions, the Nasdaq crash did contribute to an economic slowdown and may have been the primary cause of a recession that hit its trough in late 2001.
- ⌚ Because a large part of the economy had geared up to serve the dotcoms—and had even expanded in anticipation of continued growth—many of these companies also began to cut back as the market crashed, and the dotcoms started to fail by the dozens.



The dotcom bubble took place because interesting new business ideas were pursued to extraordinary, sometimes ridiculous, extremes. But at the core of the boom was an essential truth about the potential value of new intangible assets—value that became proven over time.

SUGGESTED READING:

Cassidy, *Dot.com*.

Lewis, ed., *Panic!*, part III.

QUESTIONS TO CONSIDER:

1. One of the main problems behind the dotcom bubble was the challenge of valuing the stock of start-up companies that rely on intangible assets. Should we use completely different methods to value intangible assets and the companies that rely on them, or can these assets and companies be valued using the standard tools of valuation? How does the uncertainty surrounding the valuation of these companies make a stock bubble more likely?
2. Alan Greenspan, the former chairman of the Federal Reserve, famously alluded to “irrational exuberance” as a factor in the dotcom bubble. If the government believes that irrational exuberance is driving up asset prices, should it intervene to prevent a bubble from forming, or deflate an asset bubble? If so, what policy tools should be used?

ROGUE TRADERS AT SOCGEN AND BARINGS

LECTURE 19

Rogue-trading cases are fundamentally all the same in terms of the risk-management mistakes that allow a trader to go rogue. This lecture examines 2 of the most famous—and costly—rogue-trading episodes in recent history: the stories of Jérôme Kerviel, whose unauthorized trading cost the French bank Société Générale more than \$6 billion, and Nick Leeson, whose trading bankrupted Baring Brothers.

TRADING OFFICES

Trading is organized into 3 functions, commonly called offices in financial lingo: front office, middle office, and back office.

1. The front office consists of the traders, and all their gear, as well as the people who support them by crunching numbers and working out theoretical models. In other words, the front office thinks up the trades and executes them. Rogue traders are always found in the front office, because you have to be able to trade to be a rogue trader.
2. The back office handles all the chores that must be performed once a trade is set. It also does all the record keeping.
3. The middle office consists of risk managers who set the trading limits for the overall operation as well as for individual traders and who make sure that the traders operate within these limits. The middle office sets the risk-management policy, but the day-to-day enforcement rests with the back office.

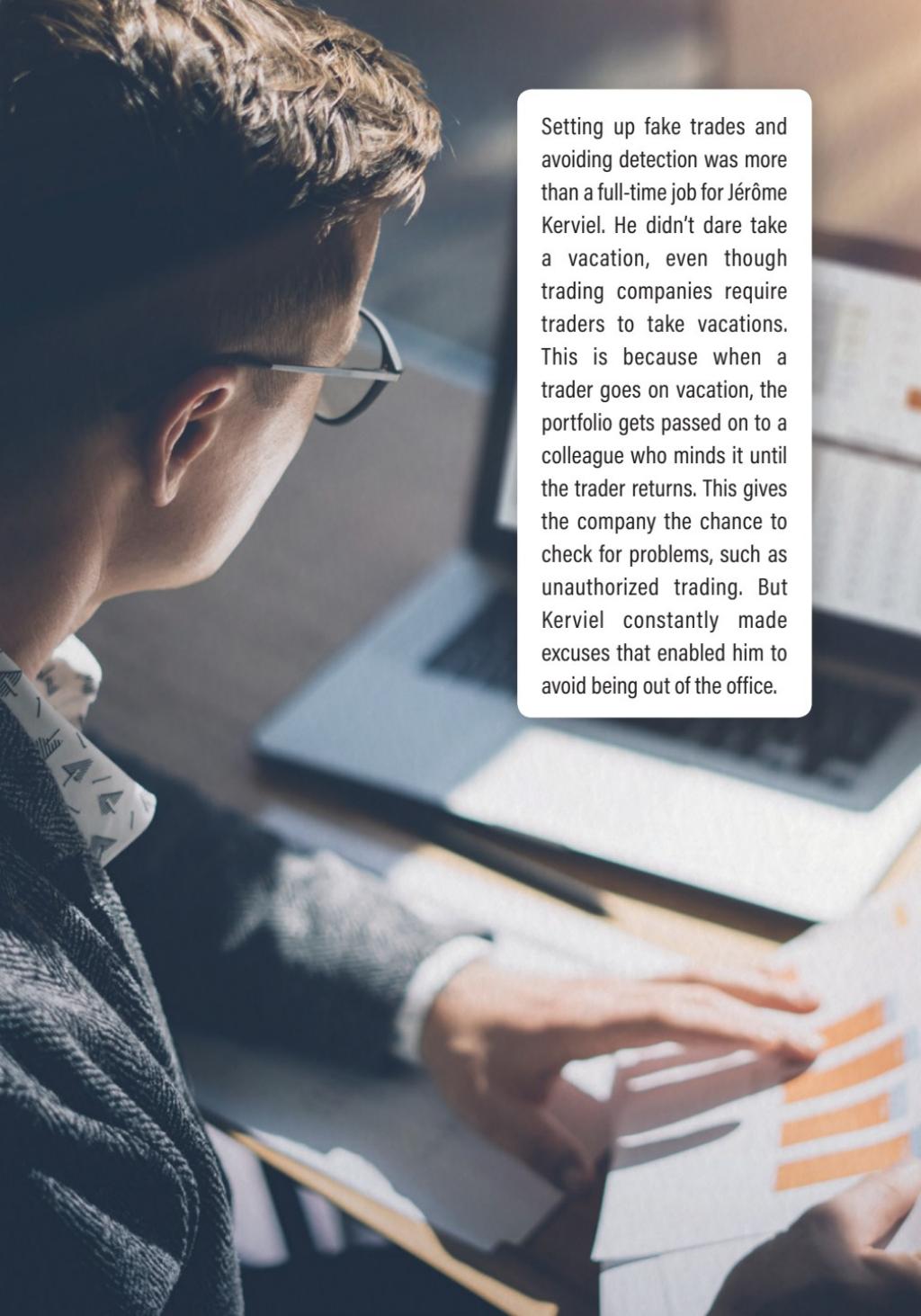
JÉRÔME KERVEL

- ⌚ The bank Société Générale—or SocGen, as it is known more informally—is one of France’s largest and most respected financial institutions. Jérôme Kerviel, a former trader for SocGen, didn’t go to a prestigious-enough university to be recruited for a trading job, so he started his career in 2000 in the SocGen middle office, looking over the shoulders of the front-office traders and calling them to task when they broke risk-management rules.
- ⌚ After 5 years, Kerviel convinced his superiors to give him a chance. In 2005, he moved to SocGen’s lowest-level trading, called the Delta One trading desk. He was assigned to trade futures contracts on major European stock indexes, such as Germany’s DAX and London’s FTSE 100, and was required to follow a specific trading strategy: He would buy a large number of futures contracts on one index and, at the same time, sell an almost-equal amount of futures contracts on another index.
- ⌚ This is a classic strategy, very similar to one used by the original hedge funds in the 1940s. The idea is that the traders might have the view that stocks are going to rise but want to hedge this bet so they won’t lose too much if they’re wrong.
- ⌚ So, for example, in addition to buying futures contracts on the DAX—and earning profits if the DAX rises—the traders simultaneously sell futures contracts on a related stock index, such as the FTSE 100. If you sell futures contracts short, then you’ll profit when stock prices fall. This way, with a long position in one stock market and a short position in another, the traders are hedged if prices fall rather than rise.
- ⌚ One of the tricks behind this strategy is that the traders choose 2 indexes that tend to rise and fall together, but not perfectly. So, if the DAX rises, chances are that the FTSE will also rise. This will reduce the profits from the trade,



because the short position in FTSE futures will fall in value, offsetting some of the profits from the long position in DAX futures. But there's a chance that the DAX will rise by more than the FTSE does and the trade will make more money.

- ⌚ In addition, the traders invest more on the side of the bet that reflects their belief about which direction the market is headed. So, if both stock indexes rise by the same proportion, then the long position in DAX futures makes a larger total profit in dollar terms than the loss on the short position in FTSE futures.
- ⌚ These hedged trades protect against big losses. But the profits are also small. The traders hope to earn money by being right more often than they're wrong and by getting lucky on some days and making somewhat larger profits than usual.
- ⌚ Therefore, the Delta One desk was expected to earn fairly small—but steady—profits for the bank. Kerviel was expected to earn €10 to €15 million of profit a year for SocGen. And the mismatch between the sizes of his long and short futures positions was never supposed to exceed €500,000 at any time.
- ⌚ But Kerviel had other plans. He would buy large amounts of futures contracts on various European exchanges and not take the offsetting hedging position of also selling contracts short. Instead of adhering to plan, Kerviel increasingly set up fake trades that made it look like he was hedging when he wasn't. He was making larger and larger bets that stock prices would rise.
- ⌚ How could he do that? Didn't SocGen have a back office and middle office to check on him and stop him? Of course it did. But during the time that Kerviel spent working in the middle office, he had learned all the intimate details of how the risk-management system worked, including what happened when rules were broken and, perhaps most importantly, how his coworkers enforced the rules. He learned all the weaknesses of the system—how to manipulate it and beat it, at least temporarily.
- ⌚ Kerviel would pretend to enter into contracts with traders at other banks, in which he agreed to sell millions of euros' worth of stock indexes. The contracts called for him to deliver the securities at some future date, so they were equivalent to selling futures contracts short.



Setting up fake trades and avoiding detection was more than a full-time job for Jérôme Kerviel. He didn't dare take a vacation, even though trading companies require traders to take vacations. This is because when a trader goes on vacation, the portfolio gets passed on to a colleague who minds it until the trader returns. This gives the company the chance to check for problems, such as unauthorized trading. But Kerviel constantly made excuses that enabled him to avoid being out of the office.

- ⌚ Kerviel faked this particular type of trade because the only documentation he needed was the confirmation statement he would email to the trader at the other bank. He would take electronic copies of old confirmation statements—from trades that he had executed in the past—and simply edit them to say whatever he needed them to.
- ⌚ Kerviel also knew that from time to time all of his trades would be electronically verified, basically by sending additional confirmation statements to his counterparties. Any one of these electronic inspections should have led to the discovery of his fake trades. But he knew exactly when these electronic inspections would occur, so immediately before each inspection, he would cancel the trades—using the special passwords to the electronic trade-tracking system from his time in the middle office.
- ⌚ Later, Kerviel would go back into the system and reenter the fake trades he needed. He had to do this because if his net position became unbalanced for more than a few minutes, this would set off an alarm in the back office and a middle-office employee would contact him to see what was going on.
- ⌚ This actually happened about 2 dozen times during 2007. Each time, Kerviel just said that he was having problems entering his trades into the system or that he had just made a typo and promised to rebook the trade. That was enough to satisfy the middle-office employees.
- ⌚ Because of his ability to create fake hedging trades and manipulate the risk-management system at SocGen, Kerviel was able to build up a massive unhedged long position in several major European stock indexes. By early 2008, he'd invested €30 billion in the Euro Stoxx 50 index, €18 billion in the DAX, and €2 billion in the FTSE 100—for a total of €50 billion invested. And for a while, this strategy was a big winner.
- ⌚ Sources disagree, but Kerviel might have reported paper gains of up to €1.6 billion at the end of 2007. If true, that would have accounted for a significant fraction of the bank's profits that year. But in early January 2008, the situation unraveled. He had to fabricate larger and larger hedges as his long position grew into the billions. These trades became so large that one of them triggered an investigation.

- ⌚ Before the investigators had time to reach any conclusions, however, the markets started to turn down and Kerviel's positions started to go into the red. By January 19, 2008, when the bank's internal audit uncovered his massive investments, he had lost €2 billion.
- ⌚ Even after that loss, the total value of the investment portfolio Kerviel had accumulated was greater than SocGen's entire market value. The bank immediately went to work selling off the holdings. But when you liquidate huge amounts of assets quickly—especially when the markets are falling—you're going to push down the value.
- ⌚ SocGen lost an additional €2.9 billion as it liquidated Kerviel's positions, bringing the total carnage to more than \$6 billion at the 2008 exchange rate.
- ⌚ Kerviel was indicted on criminal and civil charges and eventually received a 5-year prison sentence, with 2 of the years suspended. But he maintained during trial that bank managers had known about his rogue trades and condoned them as long as they were making money.

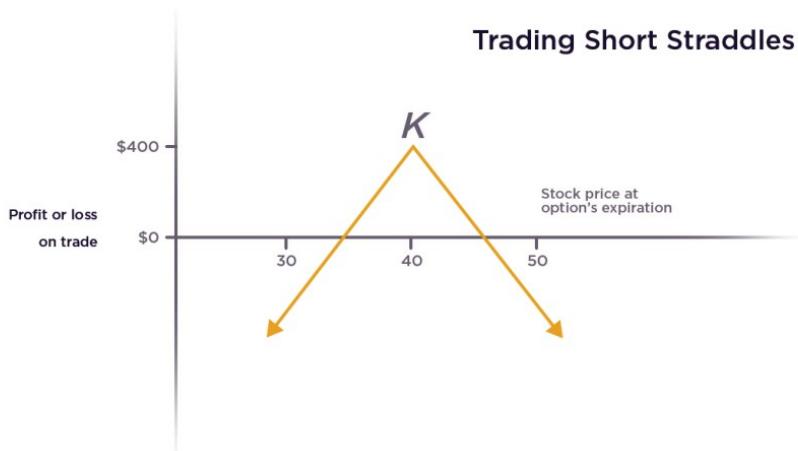
NICK LEESON

- ⌚ Nick Leeson hadn't earned the school grades needed to be accepted into a British university, so after finishing secondary school, he had gone to work in 1985 for a small London bank in its back office. He moved to Morgan Stanley in 1987, again in back-office operations, but now to support derivatives trading.
- ⌚ In mid-1989, the very old and prestigious Barings Bank hired Leeson away from Morgan Stanley, and within his first 2 years, he had built a reputation as an effective troubleshooter and expert in derivatives trading. When the company's Singapore subsidiary purchased seats on the Singapore International Monetary Exchange (SIMEX) in 1992, Leeson was made the head of back-office operations there.

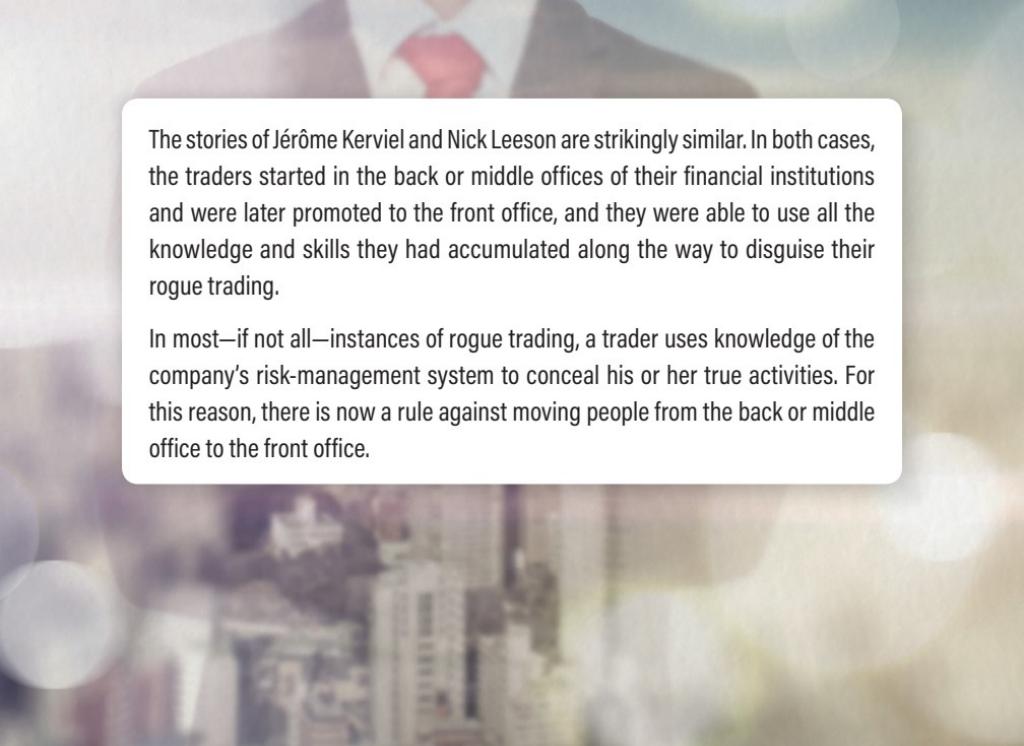
Nick Leeson set up an error account numbered 88888—a reference to Chinese numerology, in which the number 8 brings luck with respect to earning or winning money.

- ⌚ At the same time, he was also made the manager of the traders. Effectively, he became Barings' lead trader in Singapore and its back-office chief.
- ⌚ The Singapore unit of the global bank wanted to expand its derivatives trading on SIMEX as well as on other regional exchanges. Things seemed to go well—at first. In 1993, Leeson reported nearly £9 million in trading profits, and in 1994, the number was more than £28 million. But these numbers were fake.
- ⌚ In reality, the Singapore unit was losing money. The losses were already £21 million in 1993, and they rose to £185 million in 1994 before exploding in 1995.
- ⌚ While Leeson was making several big bets in the derivatives markets, the bulk of his problems were caused by 2 specific trading strategies.
 - ⌚ The first was quite simple. He bought thousands of futures contracts on Japan's Nikkei index, which reflects the value of the Tokyo Stock Exchange. This was essentially a bet that Japan's most important stock market would rise. But it was a major contrarian position. The Nikkei index had peaked at a level of nearly 40,000 in December 1989 and was trading at just below half this level by the time Leeson arrived in Singapore. He must have thought that investors had overreacted and pushed the Nikkei index down too far, so he began to buy futures on the index, with the intention of making big profits when the Nikkei rebounded.
 - ⌚ The second strategy Leeson pursued seemed inconsistent with the futures contracts. But its main purpose wasn't to generate profits. Instead, it was to generate cash.
- ⌚ As Leeson accumulated more and more futures contracts—and as they lost money—he had to pay more and more cash into his margin accounts. In contrast to stock trading, where margin is used sparingly, futures trading makes extensive use of margin, or borrowed money. That's one of its big attractions for traders.
- ⌚ But if your futures positions lose money, you will receive margin calls from the exchange and will have to deposit cash to make up for the losses or your positions will be liquidated.

- ⌚ To obtain cash, Leeson could—and did—borrow from Barings’ home office in London. But if he borrowed too much, this would lead to questions he wanted to avoid, so he began to trade in the options market by selling thousands of options contracts.
- ⌚ These were put and call options on the Nikkei index. And Leeson sold equal numbers of each. By selling—rather than buying—puts and calls, he raised a lot of cash quickly, which he could use to cover his margin requirements. But raising cash this way posed a big risk: If the markets moved against his bet that the Nikkei would rise, he’d be in double jeopardy.
- ⌚ Leeson was selling matched sets of put (or sale) and call (or purchase) options on the Nikkei. In options lingo, a matched set of one call and one put option on the same underlying asset is called a straddle. If you buy the call and the put, you’re said to be buying a straddle, but if you sell the call and put, you’re said to be selling a straddle. So, Leeson was selling straddles on the Nikkei to raise cash.
- ⌚ The straddle is a common trading strategy in the options markets. When a trader sells a straddle on any asset, it’s essentially a bet that the price won’t move very much in either direction. This is called a bet on low variation, or low volatility, in the price. If the trader is correct and the price of the Nikkei doesn’t move very much, then the seller earns a lot of profit. But if the price moves significantly in either direction, the seller can lose big.



- ⌚ Leeson's futures contracts on the Nikkei were losing money, because the Tokyo stock market was generally drifting down, but the straddles remained profitable. But all that changed on January 17, 1995, when a large earthquake in the industrial city of Kobe sent the index down sharply—by several hundred points. Not only did this cause the futures contracts to drop in value, but it also turned the small profits on the straddles into losses.
- ⌚ Leeson's trades were losing money twice as fast as before. This was not only the end of Leeson's trades; it was also the end of Barings Bank. Leeson's trades closed out with losses of more than £800 million—several hundred million more than the entire net worth of Barings Bank. So, the company was bankrupted.
- ⌚ Because only the Singapore subsidiary was rotten, the Dutch banking group ING was willing to take over the parent organization, paying exactly £1 for the privilege. ING also had to make good on the losses from Leeson's trading, so effectively it paid a reasonable price to get all of Barings' assets.
- ⌚ Leeson was able to turn big losses into paper profits for the previous 2 years—and get away with it—by manipulating the back-office records of his trades. Because he was both the head of trading and the head of the back office in Singapore, this gave him the ability to disguise what he was doing.
- ⌚ Leeson set up a special account called an error account, which tracks the costs to a trading company of the mistakes it makes in handling its customers' accounts. And it generally has a low value, because these mistakes should be rare. But Leeson booked all of his trading losses in this special error account and then had his back-office staff shred the records, which should have been passed to the head office in London. Only Leeson received the documentation.
- ⌚ Leeson also set up a regular trading account that contained the numbers he showed to London. At the end of each trading day, he had his back-office staff replace the trades he actually performed with a set of fake trades. These showed profits in the regular trading account but losses in the error account.
- ⌚ In many cases, Leeson established fake trades in which the regular account and the error account dealt with each other. That made it especially easy to manipulate profits and losses. All of this manipulation was illegal, and Leeson spent 4.5 years in prison because of it.



The stories of Jérôme Kerviel and Nick Leeson are strikingly similar. In both cases, the traders started in the back or middle offices of their financial institutions and were later promoted to the front office, and they were able to use all the knowledge and skills they had accumulated along the way to disguise their rogue trading.

In most—if not all—instances of rogue trading, a trader uses knowledge of the company's risk-management system to conceal his or her true activities. For this reason, there is now a rule against moving people from the back or middle office to the front office.

SUGGESTED READING:

Jacque, *Global Derivatives Debacles*, chaps. 10 and 11.

QUESTIONS TO CONSIDER:

1. Do you agree with the claim that all rogue traders are the same? If not, what are the key differences between them that make each case distinct and different?
2. In both rogue-trading cases, there are hints that the managers of the company were aware of the rogue trading and tolerated it as long as it was profitable. Do you believe that this was happening in these cases, or that it happens in most rogue-trading cases? To the extent that this claim is true, what steps can companies take to prevent managers from tolerating successful rogue traders?

UNHEDGED! LONG-TERM CAPITAL MANAGEMENT

LECTURE 20

Long-Term Capital Management (LTCM) was a hedge fund that had existed for barely 4 years when it went into a death spiral, yet even the possibility of its demise threatened to take down most of Wall Street with it. The rise and fall of LTCM is a virtual showcase of risk-management errors—mistakes made by the hedge fund as well as by the banks that it did business with. And while cutting-edge financial modeling played a role in the firm's collapse, what really spelled its demise was that LTCM and its banks ignored some of the most basic rules of finance.

ARBITRAGE AND CONVERGENCE TRADES

- ⌚ In 1977, at one of Wall Street's broker-dealer firms—Salomon Brothers, which was known for its bond business—an ambitious trader named John Meriwether was authorized to set up a group to trade bonds on behalf of the company. It was called the domestic fixed-income arbitrage group.
- ⌚ Meriwether was one of the first people on Wall Street to hire quants—people with high-level math and computer science skills—as traders. He wanted traders who were smarter than everyone else, people who not only understood the math behind bond and derivatives pricing but who could also build their own models of the markets. And that's what they did.
- ⌚ The arbitrage group traded based on their own models. Its specialty was the convergence trade, which is a bet that the returns on 2 assets will converge over time. In practical terms, it means that the difference between the rates of return on 2 bonds will get smaller.
- ⌚ For example, suppose that a 6-month treasury bill currently yields 3% a year and the 3-month treasury bill yields 2.5% a year. This means that there's a spread—a difference—of 0.5% between the 2 yields. A convergence trade is a bet that this difference will shrink over time.
- ⌚ If the difference in yields shrinks, then the difference in bond prices will also shrink. But because there's an inverse relationship between a bond's price and its yield, the bond with the higher yield will have the lower price and the bond with the lower yield will have the higher price.
- ⌚ In this example, the 6-month treasury with a 3% yield will have a lower price than the 3-month treasury with a 2.5% yield. Because the trader expects the prices to converge, he or she can buy the 6-month treasury, expecting its price to rise, and sell the 3-month treasury short, expecting its price to fall.
- ⌚ If the trader is right, then he or she will make money on both parts of the trade. But even if not, as long as the trader is correct about the convergence, then any money he or she loses on one part of the trade will be more than made up by the profit on the other part of the trade.

- ⌚ Notice that in this convergence bet, the trader sells the asset with the higher price and buys the asset with the lower price. That's how an arbitrage trade goes.
- ⌚ But it's important to keep in mind that the convergence trade is not true arbitrage—it's still speculative. In true arbitrage, the trade would profit regardless of what happens to market prices. Opportunities like that are extremely rare, so most arbitrage trading involves at least some risk. And that includes convergence trades.
- ⌚ There's no guarantee that the yields on 2 different assets will actually converge. The spread between their yields could get even wider.
- ⌚ This is where the models come in. Mathematical and statistical models can help traders identify when the returns on 2 assets are likely to converge in the future. Basically, these models calculate the expected, or average, spread between 2 assets. When the spread is significantly wider than average, the trader initiates the convergence trade on those 2 assets.
- ⌚ For more than a decade, Salomon's arbitrage group earned large and steady profits on its convergence trades. It applied them not only to bonds of various kinds but also to fixed-income derivative instruments.
- ⌚ Meriwether was promoted to the head of all bond dealing at Salomon, though his attention was still focused on the arbitrage group. Unfortunately, this lack of attention to Salomon's other bond business would cost Meriwether his job.
- ⌚ In 1991, one of Salomon's government bond traders, Paul Mozer, falsified bids that he submitted on a US treasury bond auction. He submitted extra bids that were made to look like they came from Salomon clients when instead their purpose was to allow Mozer to buy a larger share of newly issued treasury bonds for Salomon than the regulations allowed. This, in turn, gave him enough market share to drive treasury prices in his favor.
- ⌚ Although Mozer admitted this to Meriwether, his boss did nothing to punish the trader and did not report the incident to the Treasury. But Mozer was later discovered to have manipulated the treasury markets multiple times, and Salomon was forced to divulge this information to the Treasury.

- ⌚ In the ensuing scandal, Meriwether was forced to resign. The Securities and Exchange Commission fined him \$50,000 for failing to properly supervise his employee and suspended him from the industry for 3 months.

MERIWETHER'S DREAM TEAM OF FINANCE

- ⌚ Despite the tarnish of the scandal, Meriwether was still regarded as a star trader. He could have moved to another investment bank, and Salomon offered to hire him back after a short while. But Meriwether decided to pursue his vision of models-based trading by starting a hedge fund.
- ⌚ Hedge funds are private investment partnerships that pursue above-market returns. And to earn market-beating returns, you have to take on a significant amount of risk.



The term "hedge fund" was coined because the original funds of this type simultaneously bought certain stocks while selling other ones short, claiming that doing so hedged their bets. They weren't really hedging, but the name stuck.

- ⌚ Hedge funds are typically open only to high-net-worth individuals and to institutional investors, such as businesses, pension funds, and college endowments. These investors are generally fairly sophisticated and need a good reason to invest their money with a particular money manager.
- ⌚ Meriwether basically reassembled the core of his team from the Salomon Brothers arbitrage group, which had been so successful. But even that wasn't necessarily enough to attract investors with the kind of money that Meriwether was aiming to start with.
- ⌚ He wanted \$2.5 billion—which was about 100 times the size of the typical start-up hedge fund in the early 1990s—so he recruited 2 of the biggest names in finance theory to be the fund's advisors. They were Robert Merton and Myron Scholes, 2 of the 3 people who had solved one of the most important problems in modern finance: how to price options correctly. Meriwether also recruited the vice chairman of the Federal Reserve, David W. Mullins, to help manage the fund.
- ⌚ Meriwether had now assembled what came to be known as a dream team of finance. The fund's star power played a huge role in what was to follow. The first thing it did was to enable Long-Term Capital Management (LTCM) to collect \$1.25 billion in funding. Even though this was only half of Meriwether's goal, that was still the most money any new hedge fund had ever raised up to that time.
- ⌚ Part of the reason why Meriwether named the fund Long-Term Capital was to indicate that the trades the fund made might need a long time to turn profitable. And to make sure that these trades had sufficient time to mature, LTCM required investors to leave their money in the fund for a minimum of 3 years.
- ⌚ All hedge funds limit their investors' ability to withdraw their money, but LTCM's requirement was extreme. Similarly, it was much more secretive than the typical hedge fund. It revealed virtually nothing to its investors about its investing strategies or the assets it was trading.
- ⌚ The strategy that LTCM pursued was basically a continuation of the convergence trades that Salomon's arbitrage group had specialized in. But there was an important twist, because many of the convergence trades that it was interested in involved very small interest rate spreads.

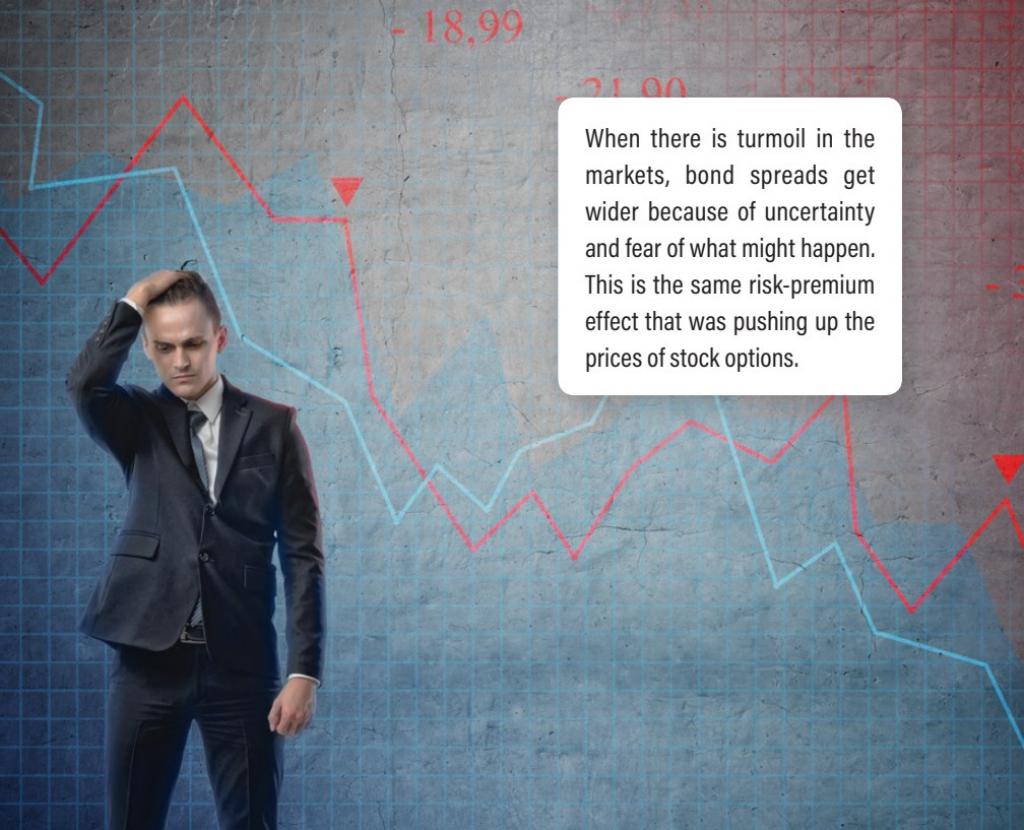
- ⌚ For example, one convergence trade involved the difference between the most recently issued 30-year treasury bond and the 30-year treasury that was issued 6 months prior to that. The interest rates on these 2 bonds were very close to each other. The spread between them does change over time, but the size of the change is typically measured in basis points—hundredths of a percent. Even when the trade is successful, it would earn pennies on every \$100 invested.
- ⌚ The only way to make a trade like this worthwhile is to use borrowed money, or leverage—and lots of it. Leverage is a returns multiplier, so if LTCM could use enough of it, this would multiply the pennies it earned on the treasury convergence trade into dollars.
- ⌚ The amount of leverage needed, though, was staggeringly high. LTCM intended to borrow between \$20 and \$30 for each \$1 contributed by its investors.
- ⌚ The firm borrowed hundreds of millions—and even billions—from the major Wall Street banks. Each bank lent huge amounts to the fund on extremely generous terms. In part, the banks were lending on the basis of the reputation of LTCM’s dream team. But each bank also hoped that a sweetheart loan would entice LTCM to trade with it, which would reveal information to the bank about what LTCM was up to. Then, they could figure out the firm’s strategy, and even copy it, leading to potentially big trading profits.
- ⌚ For the first few years of its existence, Meriwether’s firm lived up to expectations. In its first year—1994—the fund returned 28%. In 1995, the return rose to 59%. But keep in mind that this was based only on the money the fund’s investors had contributed before being leveraged many times over to magnify much smaller gains into larger ones.
- ⌚ LTCM was now managing more than \$100 billion in assets. And that was based on \$28 borrowed for each \$1 contributed by the investors.
- ⌚ In 1996, the fund returned 57%. Even more astonishingly, along the way it never had a month in which it lost more than 1%.

Usually, high returns come with high risks, so a big gain one month is followed by a big loss the next. But in Long-Term Capital Management's first 3 years, big gains were followed by big gains, while the losses were rare and small.



THE FLIGHT-TO-SAFETY TREND

- ⌚ In 1997, things started to change. If anything, LTCM's trades had been too successful, and many bond spreads converged toward their averages, leaving little room for further profits.
- ⌚ Meriwether now grew concerned that he had too much capital to invest well. After all, the initial \$1.25 billion had grown to more than \$7 billion between 1994 and the end of 1997. So, at the end of 1997, the firm returned \$2.7 billion of its capital to the outside investors, representing all the market gains it had earned and any new contributions received after 1994.
- ⌚ But that still left nearly \$5 billion in the fund at the start of 1998. And by then, the traders had found a new strategy to add to the convergence trades they were making.
- ⌚ In the second half of 1997, several Southeast Asian countries had suffered dramatic currency crises, unsettling the global financial markets. Investors were scared that more crises were coming, so they bid up the prices of hedging instruments, especially put options on stock indexes.
- ⌚ LTCM's models indicated that the put options were overpriced, so the firm went heavily into the business of selling put options on equity indexes. The fund effectively committed itself to buying hundreds of billions of dollars' worth of equities if stock prices fell too much. And because these commitments were made using derivatives, the put options didn't show up as liabilities on the firm's balance sheet.
- ⌚ The main problem with this trade was that despite the fact that LTCM held thousands of assets, it was putting all its eggs in one basket. Every single trade—including the equity option—was a bet that the markets would calm down. LTCM's traders had found thousands of different ways to bet that the level of risk in the markets would fall, but at the end of the day, it was still the same bet.



When there is turmoil in the markets, bond spreads get wider because of uncertainty and fear of what might happen. This is the same risk-premium effect that was pushing up the prices of stock options.

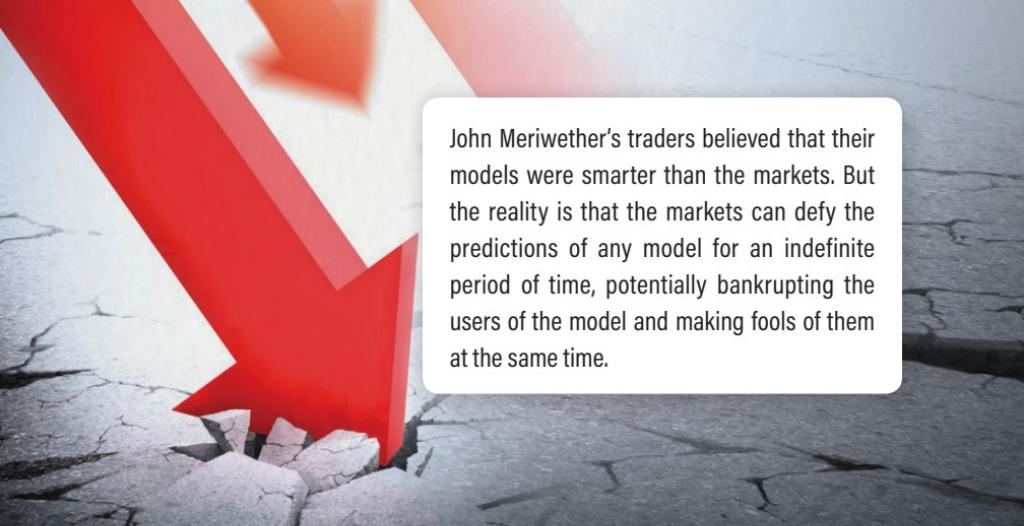
- ⌚ LTCM's traders also seemed to forget that the level of risk in the market is as much a matter of perception as it is a number that follows the laws of statistics. Somehow, the firm's traders had failed to notice that the Southeast Asian crisis had caused many investors to upwardly revise their estimates of market risk and that this was leading them to make big changes to their portfolios.
- ⌚ Investors now began to sell off assets that suddenly seemed too risky for comfort and move the money into safer investments. This reaction to an increased perception of risk occurs so reliably that it is called flight to safety and flight to quality (as in high-quality bonds).
- ⌚ The flight to safety brings comfort to investors. But it would become LTCM's worst nightmare.

- ⌚ In a flight to safety, investors sell the riskiest and least-liquid assets, pushing their prices down, and buy the safest and most liquid assets, pushing their prices up. The result is that bond spreads rise, even if the bonds differ only a little in terms of safety or liquidity. And the prices of hedging instruments, such as put options, also rise.
- ⌚ But LTCM had bet that those spreads and prices would fall. By May 1998, the global flight-to-safety trend was causing LTCM to lose money on its trades. Its return was -6.7% in May, followed by another 10% loss in June.
- ⌚ In July, the fund avoided losing more money, but during the first 2 weeks of August, the losses resumed. Not only was the news bad from emerging markets, but some investment banks—including Salomon—were trying to get out of the bond-arbitrage business altogether, further pushing prices in the wrong direction, from LTCM’s perspective.
- ⌚ Then, on August 17, 1998, the government of Russia declared a moratorium on paying its debt. The markets seemed to expect that Russia would get a package of assistance, given how the International Monetary Fund (IMF) had put together loan packages for troubled Southeast Asian governments the year before, so the news didn’t create a major disturbance that day.
- ⌚ But later in the week, the IMF announced that it wouldn’t rescue Russia. And that’s when the markets really reacted. The flight to safety under way dramatically intensified. Investors sold off bonds with even a hint of risk and seemed to want only the most recently issued US treasuries. Nobody had ever seen a flight to safety this extreme.

THE END OF THE FUND

- ⌚ LTCM’s portfolio was taking huge losses. On a single day, August 21st, it lost more than half a billion dollars. Virtually every trade it entered into was losing money. Since the end of April, the firm had lost about \$1.7 billion, or more than a third of its capital. And more losses were on the way.
- ⌚ Even amid the chaos, Meriwether and his traders were convinced that their bets would turn profitable. The greater danger that concerned them was running out of capital before the recovery. So, they decided to approach wealthy individuals and big financial institutions for investments.

- ⌚ But most individuals weren't interested or didn't want to be the first to invest. And while the investment banks and other financial institutions were potentially interested, after having a close look at LTCM's trading records, nobody wanted to invest. There were too many trades in too many assets. Four weeks of frantic searching for new capital yielded nothing, while another \$2 billion of its funds melted away.
- ⌚ Bankruptcy was now a real possibility. But that, too, was a potential nightmare for everyone involved, including the banks that had loaned billions to LTCM. Given the state of the markets, the prices they could get for LTCM's assets in a liquidation scenario would surely be terrible.
- ⌚ Each bank faced the likelihood of losing at least half a billion dollars on their loans to LTCM, and probably a lot more. The obvious answer was to work together to avert bankruptcy and salvage what they could from the firm.
- ⌚ But the banks experienced what economists call a coordination failure: None of them would play the role of the coordinator for fear of being taken advantage of by the others, and without a coordinator, there wouldn't be a joint solution to the problem—or any solution.
- ⌚ In late August 1998, Meriwether decided to contact William McDonough, the president of the New York Federal Reserve Bank, to brief him about the situation, and in late September 1998, the Federal Reserve Bank of New York reluctantly took on the role of coordinator. It hosted meetings between LTCM's main creditor banks and between all of the major investment banks that had loaned significant funds to the firm.
- ⌚ Representatives from 14 banks based in the United States and Europe convened in the New York Fed's board room to hammer out an agreement to invest \$3.6 billion of new money into LTCM. Most of the banks agreed to pay \$300 million each; a few paid about \$100 million each. LTCM's management team was required to stay on to manage its positions, though they were closely supervised by the investment banks.
- ⌚ The fund continued to lose money for several months. But the markets calmed down, and the fund's capital rose back above \$3 billion. At that point, the banks decided to slowly liquidate fund assets and shut it down for good.



John Meriwether's traders believed that their models were smarter than the markets. But the reality is that the markets can defy the predictions of any model for an indefinite period of time, potentially bankrupting the users of the model and making fools of them at the same time.

SUGGESTED READING:

Jacque, *Global Derivatives Debacles*, chap. 15.

Lowenstein, *When Genius Failed*.

QUESTIONS TO CONSIDER:

1. In the wake of the crisis at Long-Term Capital, regulators around the world have tried to find ways to limit the risks that hedge funds can take on. Can regulators successfully prevent hedge funds from taking on excessive risks? Why or why not? If regulators could do this, do you think it would reduce hedge fund returns so much that they would no longer be attractive to investors?
2. One of the problems identified in this lecture was that banks that lent money to Long-Term Capital did not do a good job of due diligence, primarily because the hedge fund had organized a “dream team” of managers. Do you think this problem persists in the investment industry, in which superstar money managers, government officials, or academics do not experience sufficient scrutiny when they start new investment funds? Can you think of examples of superstars who seem to avoid tough scrutiny when they start funds or make investment decisions?

THE LONDON WHALE AND VALUE AT RISK

LECTURE 21

One great irony of modern finance is that many risk-management tools have ended up inflicting huge damage on companies, the markets, and the economy. This is the case with one the most important innovations in financial risk management: a model called value at risk (VaR). While VaR is the workhorse of modern financial risk management, it has kicked its owners pretty hard on multiple occasions.

VALUE AT RISK

- ⌚ J. P. Morgan & Co. is a big commercial bank, but one piece of its business traditionally was to act as a broker-dealer, executing trades on behalf of its customers. In the late 1980s, Morgan—like many of its Wall Street peers—became increasingly engaged in proprietary trading, meaning trading on the firm's own behalf rather than executing trades for clients.
- ⌚ In proprietary trading, the company is risking its own money. There's nothing inherently wrong with it, but it has to be done carefully and within sensible limits.
- ⌚ Morgan's managers were struggling with how to set responsible limits for their traders, and they realized that the problem was one of measurement. It was difficult to come up with a good way to measure all the risks that the company's traders were taking on. And if you can't measure risk, then you can't manage it.
- ⌚ Morgan had hundreds of traders buying and selling thousands of different kinds of financial assets, and it needed a way to summarize the different financial exposures in a way that was both accurate and easy to understand.

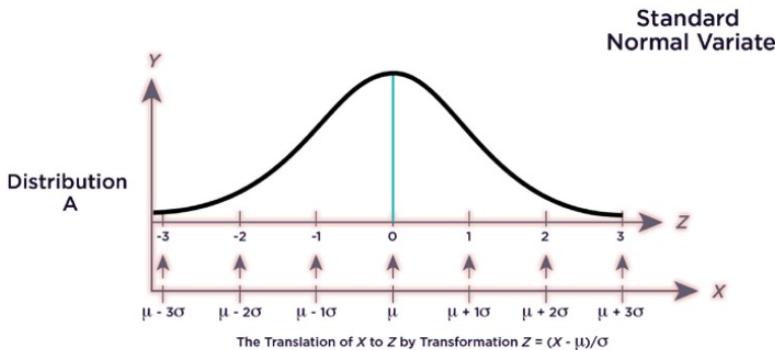


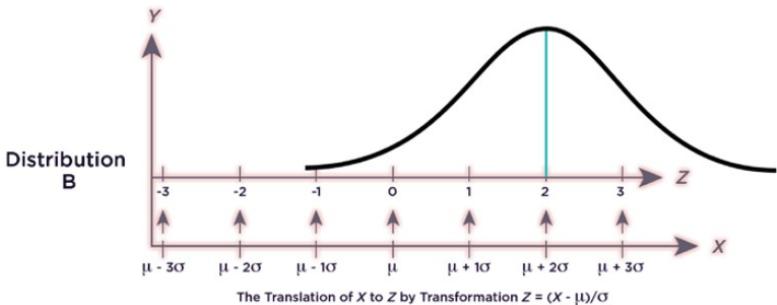
They eventually came up with what became known as value at risk (VaR), which uses basic statistical theory to estimate risk.

- ⌚ One main use of VaR is to help financial companies set aside a sufficient amount of financial reserves to absorb large losses. But companies also use VaR to set limits on individual traders. If the company wants to avoid running large risks that call for setting aside massive reserves, it can specify the maximum VaR that traders can have in their portfolios and thus force the traders to adjust their trading to the company's risk tolerance.
- ⌚ The creation of VaR was a huge leap forward in financial risk management. It gave people an easy yet useful way to measure risk, and it measured risk in a meaningful way—as the probability of experiencing a large loss.
- ⌚ VaR also simplified the discussion of risk without dumbing it down; managers could understand VaR without having to understand all the subtleties of the thousands of trades their employees made. This was one of the main reasons why VaR spread through the finance profession so quickly.
- ⌚ Best of all, VaR could be applied to any kind of financial risk. It was developed for market risk but could also be applied to credit risk, interest rate risk, or even operational risk.
- ⌚ VaR gave people a new language for describing and thinking about risk that was much better than anything we had before, and everyone was eager to learn the language. By the early 2000s, VaR had become so popular that even government regulations required banks and other financial institutions to use it to calculate the minimum capital reserves they needed to hold.
- ⌚ VaR is a useful and powerful model. But it's still just a model—with limitations and weaknesses. Unfortunately, most people in the profession weren't curious about the weaknesses and limitations of VaR while the markets were going up and people were making money.
- ⌚ If anything, people used VaR to justify taking on bigger and bigger risks. They placed full confidence in the accuracy of the model, so they made trades and other financial bets as if the VaR numbers guaranteed that they couldn't lose more than what the model predicted.

THE FINANCIAL MARKETS CRISIS OF 2008

- ⌚ Starting in September 2008, after the Lehman Brothers investment banking firm dissolved into bankruptcy, traders began to sustain losses that were much greater than their VaR models predicted. This wave of losses fed into the uncertainty and rising panic and was a significant contributing factor to the market collapse in late 2008 and early 2009.
- ⌚ Once the dust settled, economists and statisticians discovered 2 main reasons why VaR models suddenly failed. The first has to do with the data used to construct the VaR models. To perform a VaR analysis, we need to estimate the distribution of returns from some financial activity, and to do that, we need data. So, we gather data from the recent past—usually about 2 years' worth for a VaR model of daily returns—and use this to estimate the distribution.
- ⌚ But during much of the 2000s, when markets were rising, returns were much higher than usual. The market didn't have very many bad days, so the estimated distributions reflected that. Essentially, the estimated distributions shifted to the right, causing the implied VaRs to increase in absolute value toward zero. This means that they projected smaller and smaller losses.





- ⌚ But in late 2008, the distribution of returns on many assets jumped toward the left, and traders were shocked by much higher losses than they anticipated.
- ⌚ But there's more to it than that. Traders often hold very complicated portfolios, with dozens or even hundreds of different assets. To estimate a single distribution of returns on a complicated portfolio, we need to model the correlations of the returns across all the various assets in the portfolio.
- ⌚ In other words, these correlation estimates are an important input into the VaR analysis, and we assume that these correlations are stable over time. If the correlations change, however, this can dramatically change the estimated VaR.
- ⌚ In particular, VaR estimates reflect gains from diversification if the asset returns in the portfolio are less than perfectly correlated. So, a diversified portfolio should have a lower VaR than an undiversified portfolio of the same size, as long as the assets in both portfolios have similar risk and their returns aren't perfectly correlated. But if the correlations increase toward 1, then the benefits of diversification go away and the VaR of the supposedly diversified portfolio can rise significantly.

- ⌚ Again, this is exactly what happened. In the financial crisis of late 2008, asset returns that had not been highly correlated suddenly started to move together, as virtually all assets declined in value at the same time. Correlations zoomed toward 1, increasing the size of the true VaR. This was another reason why the VaR estimates from early 2008 vastly underestimated the actual risks that traders encountered.
- ⌚ Between the shift in the distribution of returns and the increase in correlations, traders were shocked by the sudden failure of their VaR models. They reacted by rushing for the exits, which drained liquidity from the markets and made prices fall that much faster.
- ⌚ Overconfidence in the models, including VaR, had led traders to set themselves up for massive losses that they were unprepared to deal with.

THE LONDON WHALE

- ⌚ The story of VaR in the global financial crisis is one in which people didn't fully understand the model's limitations and weaknesses. But there's another case of VaR-related losses in which traders intentionally manipulated their own VaR model and the risk-management procedures built around it. This case is ironic because the company involved was JPMorgan Chase & Co., the successor, after a year-2000 merger, of the bank that invented VaR.
- ⌚ The incident that came to be known as the London Whale affair took place in 2011 and 2012. In gambling lingo, a whale makes very large bets and commands a lot of attention in the casinos. The London Whale was a London trader (anonymous at first) who accumulated huge positions in credit default swaps that drew attention to his activities.
- ⌚ A credit default swap is a contract to provide insurance against the default of a company, or government, that has issued bonds. The issuer of the bonds is called the reference entity. The buyer of the credit default swap pays a premium to the seller every 6 months, as long as the reference entity doesn't default. But if the reference entity defaults, then the seller promises to pay the difference between the par value of the reference entity's bonds and the market value of the bonds.

- ⌚ Credit default swaps are one of the most actively traded derivative instruments today—and the center of trading is in London. Part of the attraction of credit default swaps is that they give investors the ability to purchase insurance against default, which is very useful. But an even bigger attraction is that they give traders the ability to make bets related to short-term fluctuations in perceived credit risks. The premiums on credit default swaps vary day to day as news comes out.
- ⌚ If a company announces a bad quarter, for example, the premiums on credit default swaps that insure its debt will rise. So, a trader who purchased a credit default swap on a company's debt before the announcement of a bad quarter could turn around and sell it at a higher price, earning a nice profit.
- ⌚ This was basically the game that traders in Morgan's structured credit portfolio (SCP) were playing. They tried to identify credit default swap contracts that they thought were underpriced and purchase them or credit default swaps that were overpriced so that they could sell them.
- ⌚ JPMorgan Chase had been trading credit default swaps since at least the mid-2000s, but trading was organized into the SCP in 2008. This group had a few very successful years—especially 2009, when Morgan traders made big purchases of credit default swaps on General Motors, which declared bankruptcy that year.
- ⌚ After that, Morgan tried to reduce the risks that the traders in the SCP were taking. Management set daily VaRs for the SCP of \$50 million, and by the end of 2010, the traders had scaled back their positions to cover the equivalent of about \$4 billion worth of bonds.
- ⌚ But in 2011, the SCP traders began to think that credit default swaps—especially on European companies—were underpriced. Stated otherwise, they thought that most companies' default risks were greater than what was reflected in the premiums quoted in the market. So, they began to buy up contracts. By the end of 2011, Morgan's credit default swap positions had increased by a factor of more than 10, insuring the equivalent of \$50 billion in bonds.

- ⌚ In particular, one JPMorgan Chase trader—Bruno Iksil—who was based in London, was convinced that multiple defaults were likely. He began to buy up a particular type of credit default swap that insured 10 different companies' bonds at once and paid out if at least 2 companies among the 10 named in the contract defaulted. Iksil argued that the premiums on this contract were way too low, and he kept buying them, eventually amassing more than \$1 billion worth.
- ⌚ Fellow traders at Morgan expected Iksil to lose big on this trade. But only 3 weeks before the contract expired, American Airlines unexpectedly declared bankruptcy in November 2011, and Iksil's trade went from a big loser to a \$400 million winner.
- ⌚ After this, Iksil wanted to ramp up his positions even more. His strategy was to buy underpriced credit default swaps with relatively short maturities and sell overpriced credit default swaps with relatively long maturities. There was one obstacle, though: the VaR limit that JPMorgan Chase's upper management set for the SCP.
- ⌚ The limit had already been expanded to \$95 million a day by the end of 2011, but by January 2012, the actual VaR for the SCP was larger than the VaR limit for the entire company. And that still wasn't high enough for Iksil.
- ⌚ So, he had his staff build a new VaR model for the SCP. He had been complaining that the existing VaR model overstated the riskiness of his portfolio, so he asked the analysts working for his unit to come up with a "better" model that produced lower VaR estimates. It was in place by the end of January 2012.
- ⌚ The new model's risk estimates were much lower than the old ones. The estimated daily VaR went from more than \$130 million under the old model to \$66 million with the new model, which was well under the daily limit. This surprised everyone involved, including the analyst responsible for putting it together.
- ⌚ Of course, the development of the model had been rushed, and many of the parameters had to be entered by hand instead of being automated because they were under the old model. But Iksil had the result he wanted. So, the model was pressed into service. And it was full steam ahead for the London Whale.



All of this information wasn't actually discovered until well after the problems emerged. It's unclear whether the top managers at JPMorgan Chase even knew that the structured credit portfolio had developed a new value at risk model.

- ⌚ The hasty adoption of the new VaR model should have raised a whole set of red flags for the traders and managers of JPMorgan Chase. But people started to ask these questions only after the incident. When they did, they discovered that incorrect equations in the model had indeed underestimated both correlations and the probabilities of making losses. The evidence doesn't seem to suggest that these errors were intentional, but they were certainly avoidable.

- ⌚ The new VaR model allowed Iksil to triple the size of his portfolio of credit default swaps while remaining under his daily VaR limit. By mid-March, his unit had bought or sold default insurance on the equivalent of \$150 billion in bonds. Iksil's trades were so large that he was moving market prices. That's when other traders started to refer to an anonymous London Whale.
- ⌚ The other traders tried to decipher what the London Whale was up to. Some of them suspected that such big positions were unsustainable. As a result, Iksil got locked in a battle of wills. He was buying—trying to push up the price of credit default swaps—while much of the rest of the market was selling, trying to push the price down. This turned into a losing battle for JPMorgan Chase.
- ⌚ Market sentiment about credit risk was broadly turning around in early 2012. The European Union had worked out a deal to keep Greece from leaving the political and economic alliance. And this improved the credit risk outlook for other European companies. The perceived default risks of most companies fell, pushing down the premiums on credit default swaps. And the premiums declined most on the riskiest companies, which were exactly the ones that Iksil was buying. The losses were more than enough to offset the profits he made on the swaps he sold.
- ⌚ Iksil had lost more than \$600 million by the end of March 2012. More than half of that occurred on a single day, March 23. The portfolio's daily losses continued to climb in April, including a \$415 million loss on April 10. By the end of May, the SCP had lost more than \$2 billion with no end in sight.
- ⌚ The SCP was transferred to Morgan's investment banking division in July 2012, with instructions to unwind the portfolio. The process took several months and led to even more losses. By the end of 2012, the red ink had surpassed \$6 billion.
- ⌚ Because of JPMorgan Chase's size and financial strength, the company was able to absorb the losses. But they were much larger than those associated with any other rogue-trading incident.
- ⌚ Iksil and his fellow traders in the SCP were fired, and it looked as though one or more might be prosecuted. But in the summer of 2017, the US government dropped all criminal and civil charges, saying that it could not rely on the testimony of Iksil. Iksil was also investigated by the British authorities, but they took no action against him.



Leading up to the financial markets crisis, traders placed too much faith in VaR and other financial models. And the London Whale episode shows what happens when people misunderstand financial models—or manipulate them to get the answers they want.

SUGGESTED READING:

Jacque, *Global Derivatives Debacles*, chap. 17.

Rebonato, *Plight of the Fortune Tellers*.

United States Senate Permanent Subcommittee on Investigations, *JPMorgan Chase Whale Trades*.

QUESTIONS TO CONSIDER:

1. One of the main takeaways from this lecture is that trusting risk-management models blindly will lead to disaster, no matter how good the models are. What is the remedy for this behavior? In particular, what other kinds of information should professionals use, in addition to the outputs from their models, to make decisions? What kind of training should financial professionals receive to help them avoid overreliance on models?
2. Is the London Whale case another instance of rogue trading? What elements of rogue trading does it have? Do you think that modifying risk-management models qualifies as rogue trading?

THE GOLDILOCKS ECONOMY AND THREE BADS

LECTURE 22

In the 1990s and early 2000s, economists referred to the United States as a Goldilocks economy because it was enjoying a long spell of economic growth that wasn't too hot or too cold—not too fast nor too slow—but just right. Economists concluded that, thanks to their wise counsel, not only was growth solid, but unemployment was historically low and inflation was moderate. All that meant the Federal Reserve didn't have to intervene, by pushing up interest rates, to prevent the economy from overheating. Overconfidence in economists' own ability to fine-tune the economy contributed to the crisis: Because economists thought they were responsible for the Goldilocks economy, they didn't look for alternative explanations of this phenomenon.

THE GREAT MODERATION

- ⌚ When economists looked at US data at the time, they noticed that the American economy seemed to be transitioning to a new type of business cycle in which it would have longer but slower expansions and shorter but shallower recessions.
- ⌚ Economists called the changes they observed the Great Moderation and thought that it had been achieved through their wise economic policy advice. In reality, the Great Moderation was the result of larger trends that helped the US economy in the short term while also allowing some troubling situations to develop.
- ⌚ Globalization was one of the main trends responsible for the Great Moderation, especially the inclusion of China into the larger world economy during the 1990s. Because of China's low labor costs, its companies began to export more and more manufactured goods to the United States and the rest of the world. Low-cost Chinese imports were one of the main reasons why inflation remained low in the United States, despite the fact that the economy was growing robustly.
- ⌚ The downside to the increase in Chinese exports to the United States was the loss of middle-class American manufacturing jobs and the general downward pressure that foreign competition exerted on US wages. For a large fraction of Americans, wages stopped growing. After adjusting for inflation, many families' incomes were no higher in 2003 than they had been in 1973.
- ⌚ You'd think that the slow growth of wages would have caused many US families to cut back their spending, leading consumption to fall and the economy to stagnate. But families didn't have to do that because of another consequence of globalization: access to international lending.
- ⌚ As a whole, America consumes more than it produces. That difference is made up by importing goods and services from other countries, such as China. Even though Americans pay for these imports in cash, the money they spend actually ends up being loaned back to them. That's because export-driven countries like China consume much less than they produce—that is, they save too much. And they need some place to invest those savings, so they buy American bonds, stocks, and other assets.

- ⌚ When Chinese investors buy American assets, they're loaning money to them. And this helps explain why American consumers could keep borrowing without putting upward pressure on US interest rates. Lots of foreign investors were sending money to America.
- ⌚ Of course, at the individual household level, people aren't borrowing from foreigners; they're borrowing from banks and other lenders, who in turn are borrowing from many sources, including international investors.
- ⌚ More importantly, the US federal government—which saw its borrowing needs rise tremendously during this period—could borrow from international investors. So, it didn't have to crowd the private borrowers out of the market.
- ⌚ But how were American households able to borrow enough money to maintain their lifestyles when their incomes were stagnating? The short answer is that they started to draw against the value of their homes. Explaining how Americans could do this requires us to meet the first of 3 bads in the story of “Goldilocks and the Three Bads”: bad monetary policy.



BAD MONETARY POLICY

- ⌚ The Fed was keeping monetary policy too loose for too long. It was putting excess cash into the American economy and, by extension, into the global economy. Every 18 months to 2 years, the Fed found a new reason to inject more money into the American economy between 1994 and 2004. In many cases, the underlying reason was to defuse a possible disturbance to the financial markets.
- ⌚ When the Fed pours money into the financial system, this can prevent a panic. But the policy works by placing money in the hands of fresh buyers who are willing to buy assets from people who want to exit the market.
- ⌚ Therefore, many people in the financial markets started to use the term “Greenspan put” to describe the Fed’s policy. Alan Greenspan was the chairman of the Fed during this time, and a put option grants someone the right to sell an asset for a predetermined price.
- ⌚ This term captures the idea that each time it looked like asset prices might fall, the Fed pumped more money into the financial markets, enabling investors who were getting cold feet to sell out to new buyers without pushing asset prices down. Many investors came to expect the Fed to come to the rescue any time there was a sign of trouble.
- ⌚ Two decades of pushing more and more money into the economy was bound to have some effect. The usual one is inflation. Consumer-price inflation was very low during this time, but asset price inflation—a general rise in the prices of real and financial assets, such as stocks, bonds, and real estate—was not. And just as inflation in consumer prices is caused by too much money chasing too few goods, asset price inflation is caused by too much money chasing too few assets.
- ⌚ The expansion of the global money supply had become so large that it significantly exceeded the expansion in the available amount of stocks, bonds, real estate, and other assets that also took place during this time.
- ⌚ And asset prices did rise dramatically. Stocks were the first to take off, starting in the mid-1990s. This is often associated with the dotcom companies, but old-economy stocks generally kept pace. And even after the bubble burst, stock prices soon went back to their previous highs.

- ⌚ In other words, there seemed to have been a permanent break in the trend of stock prices that started roughly in the mid-1990s, with stocks selling for much higher multiples of their earnings than they had previously. Several factors may be responsible for this, but one of them seems to be the increase in the money supply.
- ⌚ After the dotcom bubble burst, the next asset class to really take off was real estate. Home prices in the United States more than doubled during the 2001 to 2006 period—a blistering pace of appreciation.
- ⌚ Again, it's hard to argue that the huge expansion in the money supply didn't play an important role. After all, the expansion of the money supply kept pushing mortgage interest rates down. A decline in mortgage rates can significantly increase the amount of money a family can afford to spend on a home, and as people found out that they could afford more expensive homes, they bought them.
- ⌚ Monetary policy didn't just stoke asset bubbles. By forcing interest rates down, loose monetary policy also caused yield compression. This means that the rates of return on assets of different maturities and different levels of risk became more similar as rates fell. And this was taking place as interest rates declined across the board.
- ⌚ The problem with yield compression is that many professional fund managers were promising their investors high returns in absolute terms—for example, 8% per year—so to deliver on their promises, the managers had to find riskier assets than the ones they usually bought because those were the only ones that could produce the returns they had promised to their investors.
- ⌚ This meant that as interest rates fell, money managers around the world searched for higher-yielding assets. And some of the only assets that promised high returns were bonds backed by payments on US mortgages. This not only fueled the housing bubble, but also ensured that when it burst, investors in all corners of the financial market and all over the world would be hit.
- ⌚ This brings us to the second of the 3 bads: bad private-sector behavior.

In the United States, mortgage rates peaked in the early 1980s and then began a downward trend that had continued with only brief interruptions since then.

BAD PRIVATE-SECTOR BEHAVIOR

- ⌚ There is always some rascally behavior going on in the financial markets and the overall economy, but the rise of subprime mortgage-backed securities created new opportunities for mischief.
- ⌚ A mortgage-backed security (MBS) is formed by buying and pooling together thousands of mortgages and then selling bonds that represent claims against the payments from the mortgages; that is, the monthly mortgage payments are used to make the payments on the bonds with a little left over to compensate the people who organize the pool and issue the bonds.
- ⌚ When it's done properly, mortgage securitization increases the supply of mortgage credit by tapping into a much larger pool of potential lenders that reaches well beyond the banks. This means that more people get mortgages and at lower interest rates.
- ⌚ Subprime borrowers are people with blemished credit histories. Until fairly recently, these people were shut out of the formal credit markets entirely. But it turns out that many subprime borrowers are responsible people who simply had a bad break, such as an extended illness or a layoff. The creation of subprime lending expanded access to credit by giving people a second chance to prove they're good borrowers after all.
- ⌚ But like any tools, new and alternative investments like MBSs and subprime loans can be misused, and they became badly abused in the years leading up to the crisis.
- ⌚ Remember that one of the main consequences of the bad monetary policy is that there was a huge demand for high-yielding assets. The private sector satisfied that demand by issuing hundreds of billions of dollars' worth of high-yielding, subprime MBSs. Because the demand for US MBSs was so great, everyone involved in the process of creating MBSs found that they could increase profits by cutting corners. And nobody seemed to object.
- ⌚ Banks and mortgage brokers were the main agents responsible for screening borrowers and determining who could get a mortgage. They found that they could boost their business by lowering their lending standards because the banks and other firms that organized the mortgage pools would still buy the mortgages from them.

An illustration of a person's hand, wearing a dark blue sleeve, holding a small white house with a red roof and a chimney. The house sits on a green base with a small white fence and some flowers. A silver key lies next to the house on the palm.

One standard that was watered down during the housing boom was the traditional requirement that a borrower's mortgage payments be no higher than about 28% of their monthly take-home pay. Over time, this limit rose to 30%, and even higher.

- ⌚ The mortgage lenders had an incentive to approve as many borrowers as possible because they could immediately sell the mortgage and basically earn a fee for screening the borrowers. The more people they approved, the more fees they earned.
- ⌚ Previously, the incentive to approve more borrowers had been tempered by the fact that the people buying the mortgages would be cautious about buying low-quality mortgages. But during the early to mid-2000s, they didn't seem to mind. So, before long, there were stated income loans, in which the borrower was asked to state his or her income and the number wasn't actually verified by the loan officer.
- ⌚ The incentives to approve mortgages were especially perverse for mortgage brokers. Their job was simply to find borrowers and get them approved. They usually worked for companies that wanted to originate loans and sell them off quickly, without hiring large staffs of loan officers.
- ⌚ So, these companies offered mortgage brokers the following deal: The broker would earn a standard fee on every mortgage loan he or she originated, but if the mortgage broker could get a borrower to agree to a loan with a higher interest rate than he or she actually qualified for, the broker would get a big cash bonus. The borrowers who agreed to these high-rate mortgages were almost always subprime borrowers, who were simply happy to be getting a mortgage.
- ⌚ One big reason why the loan officers and mortgage brokers could relax their lending standards was that property values were rising quickly. Even if the borrower defaulted, the lender figured that the home would have increased so much in value that the underlying loan would be covered. And besides, the loan officers and mortgage brokers wouldn't be directly affected by a default because they would sell the loans to people organizing mortgage pools.

At the height of the housing boom, there were so-called NINJA loans, which stood for "no income, no job, no assets." In other words, lenders dispensed with many of the usual verifications that they normally used to screen mortgage borrowers.

- ⌚ It was the mortgage pool operator's responsibility to double-check the quality of the mortgages in the pool, right? This was not the case according to the people organizing the mortgage pools into bond securities. All they wanted to do was make sure that they could get investors to buy the bonds they issued. Once issued, it was the bondholder's problem if people defaulted on their mortgages.
- ⌚ To be able to make sure that all the bonds were purchased by investors, the bonds needed good ratings. And to get a rating, the mortgage pool organizers had to hire one of the big 3 rating companies—Standard & Poor's, Moody's, and Fitch—and pay them to evaluate the mortgage securities they wanted to issue.
- ⌚ Business increased so much for the bond rating agencies that they had a hard time keeping up. Revenues at the big 3 rating agencies increased by a factor of 8 between 2001 and 2006. At the same time, their staffs doubled in size, which means that each employee was doing roughly 4 times as much work as before.
- ⌚ The credit raters also offered advisory services. For a fee, they would tell the mortgage pool organizers how to structure their bonds to get the ratings they wanted. Then, the pool organizers would pay the raters another fee to evaluate the very bonds that they had been advised to create. And the bonds were awarded high ratings.
- ⌚ But it wasn't just the mortgage lenders and credit raters who were engaging in bad behavior; borrowers bear plenty of blame, too. House-flipping—the practice of rapid-fire buying and selling of homes—practically became a national sport. People would buy houses using as much credit as they could, intending to resell the property for a nice profit.
- ⌚ But by far the biggest problem with some homeowners during this period is that they became accustomed to treating their houses like cash machines, using a transaction called a cash-out refinancing.
- ⌚ In a typical refinancing, a borrower takes out a new mortgage to pay off an existing mortgage. This makes sense when interest rates fall, because it reduces the monthly payment on the new mortgage and effectively frees up income that can then be spent on other things.

- ⌚ In a cash-out refinancing, the new mortgage the borrower takes out is larger than the mortgage he or she is paying off. The borrower can do anything he or she wants with the extra money borrowed and can even deduct the interest payments on it.
- ⌚ Refinancing was one of the main reasons behind the explosion in mortgage lending, and cash-out refinancings accounted for a big share of them. US homeowners converted about \$3 trillion of home equity into cash during the period from 2001 to 2005. This behavior was rationalized by 3 widely stated beliefs: Interest rates would continue to fall, home prices would continue to rise, and borrowers could continue to refinance any time they wished.
- ⌚ Where were the regulators? The answer leads us to the third bad: bad financial regulation.

BAD FINANCIAL REGULATION

- ⌚ Many specific areas of bank regulation caused problems, including how bank-capital requirements were structured. They actually created perverse incentives for banks to take advantage of the originate-to-distribute system, the result of which was that many large banks effectively hid hundreds of billions of dollars' worth of exposure to subprime MBSs from the regulators and the public alike.
- ⌚ Excessive confidence in the power of the market drove the government's overall approach to financial regulation during this era. The widely held belief was that the markets knew best and that market discipline was sufficient to punish wrongdoing and keep the overall system safe and stable. One leading proponent of this view was Fed chairman Alan Greenspan, but other countries, including Britain, were also big believers.
- ⌚ In all fairness, financial deregulation had been under way in the United States for decades, especially during the 1990s, and economic growth had been very good. Some economists argued that part of the reason for the Great Moderation—the Goldilocks economy—was the rise of the financial markets, which enabled people to smooth out shocks to their income and also helped innovative companies get started.

⌚ But this doesn't justify the heavy emphasis that the US government placed on market discipline at the expense of regulatory involvement in the markets. There's a role for all 3 main tools of regulation: rules, examinations, and market discipline. But US regulators, by taking an approach that put private-sector discipline first—without understanding its limits—allowed the financial markets too much leeway to do whatever they wanted.

SUGGESTED READING:

Acharya and Richardson, eds., *Restoring Financial Stability*.

King, *The End of Alchemy*.

Lewis, ed., *Panic!*, part IV.

QUESTIONS TO CONSIDER:

1. Of the 3 bads in this lecture, which one do you think should take the highest priority on the reform agenda, and why? Which of these bads is the most difficult to address, in your opinion? Which is the easiest?
2. The subprime crisis has been called a Minsky moment by some observers. Look up the meaning of this phrase on the internet (one good description applied to the subprime crisis is <https://www.newyorker.com/magazine/2008/02/04/the-minsky-moment>), as well as the financial instability hypothesis of Hyman Minsky. Do you agree that this lecture describes the speculative excesses in the financial instability hypothesis that lead up to a Minsky moment?

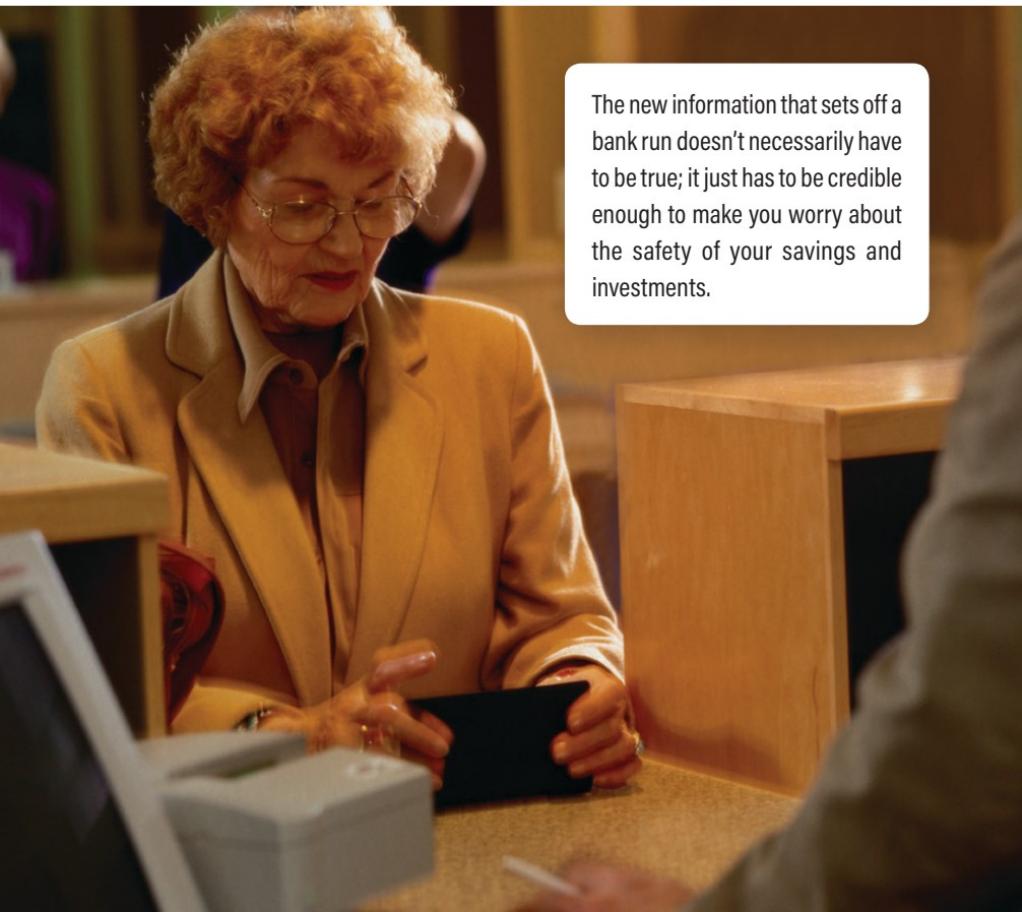
SUBPRIME DEBT AND THE RUN ON WALL STREET

LECTURE 23

In a classic bank run, a rumor starts that the bank doesn't have the resources to pay back its depositors—who react by running to the bank as fast as they can to withdraw their money while it still has cash on hand. By 2007, it was thought that bank runs had become a thing of the past, but the phenomenon was still alive and well elsewhere in the financial markets, although some of the details had changed to keep up with the times. Now, instead of bank deposits, what was in flux were short-term securities, and instead of lining up at the door, the demands to cash out were submitted instantaneously via electronic communications.

SUBPRIME MORTGAGES AND MORTGAGE-BACKED SECURITIES

- ⌚ Disorderly panic characterizes a classic bank run, and the financial markets meltdown that occurred from mid-2007 through early 2009 and swept through the global marketplace was nothing less than a modern version of a bank run.
- ⌚ New information spooked investors who had loaned out trillions of dollars, and these investors now asked for their money back. Because of the massive scale and scope of the lending that had been going on, particularly in the US mortgage market, just about every major financial institution was vulnerable. And because the banks and others—including hedge funds, investment banks, and insurers—had loaned massive amounts of money to each other, a run at one institution was virtually guaranteed to lead to others.



The new information that sets off a bank run doesn't necessarily have to be true; it just has to be credible enough to make you worry about the safety of your savings and investments.

- ⌚ The new information that came to light in early 2007 had characteristics of both fact and rumor. It was based on both anecdotes and recorded data. But nobody knew for certain how well these examples represented the entire financial market. The gist of the information was that the quality of securities backed by subprime mortgages was turning out to be a lot lower than advertised.
- ⌚ This information went against some of the most important ideas that people held about the markets at the time. For one thing, the Goldilocks economy in the United States—neither too hot nor too cold—was supposed to ensure solid growth, enabling even low-income families to support a monthly mortgage obligation.
- ⌚ A generous monetary policy followed by the Fed and other central banks was helping to push housing prices up, so buying a home was a guaranteed moneymaker. And market discipline would ensure that nobody was gaming the system.
- ⌚ Yet in early 2007, word started getting out that the 2006 vintage of subprime mortgage securities was much worse than anyone expected. A large number of underlying home loans had begun to default within months of being issued. Often, the first payment was never made.
- ⌚ Before the 1990s, subprime lending didn't really exist. You were either a prime borrower—whose credit quality exceeded the fairly high minimum standards set by a bank or other lender—or you had some kind of blemish on your credit record and didn't get any credit at all (at least not from the mainstream credit issuers).
- ⌚ But 2 things improved. First, computer power got cheaper and more people established credit scores and other electronic credit histories. In addition, more sophisticated models of credit analysis were developed to analyze retail borrowers.
- ⌚ As a result, lenders were able to draw finer distinctions between borrowers. And they learned that while some people with imperfect credit histories really were bad borrowers who should be avoided, many others had simply run into bad luck temporarily, such as a layoff or an illness, that damaged their credit history.

- ⌚ Some unlucky people were less risky borrowers than their records suggested, and lenders who took a chance on these borrowers—by offering them subprime loans—found that they could charge higher rates of interest and earn good profits, despite the borrowers’ elevated credit risk.
- ⌚ Subprime loans are for borrowers whose credit is close to the prime range but not quite there. The practice started with car loans and spread to other loans, including mortgages.
- ⌚ Subprime mortgage lending experienced its first boom in the mid-1990s as interest rates fell and economic activity picked up. In 1994, about \$35 billion in new subprime mortgages were originated. But this new niche was hammered in 1998, after Russia defaulted on its sovereign debt and investors temporarily abandoned speculative debt for safer assets.
- ⌚ Starting in about 1999, subprime mortgage lending came back stronger than ever before. The growth of subprime mortgage lending was amazing: By 2001, about 10% of all mortgage loans made that year were subprime, and in 2006, 1 in 3 mortgage loans was subprime.
- ⌚ Investor demand for high-yielding subprime mortgage-backed securities (MBSs) funded the huge growth in subprime mortgages that took place between 2001 and 2007. The private companies that participated in this originate-to-distribute model of mortgage securitization also had a big incentive to keep the machine humming.
- ⌚ Because the securitization of high-quality, prime mortgages was dominated by the government-backed market makers Fannie Mae and Freddie Mac, the best way for many banks—and the only way for many other institutions—to get into this profitable business was by securitizing subprime mortgages.
- ⌚ In 2006 alone, more than \$1 trillion in subprime MBSs were issued, accounting for more than half of all mortgage securitization in the United States that year. That brought the total amount of subprime MBSs in the hands of investors to about \$2.1 trillion. And now the stage was set for the great unraveling that took place starting in 2007.

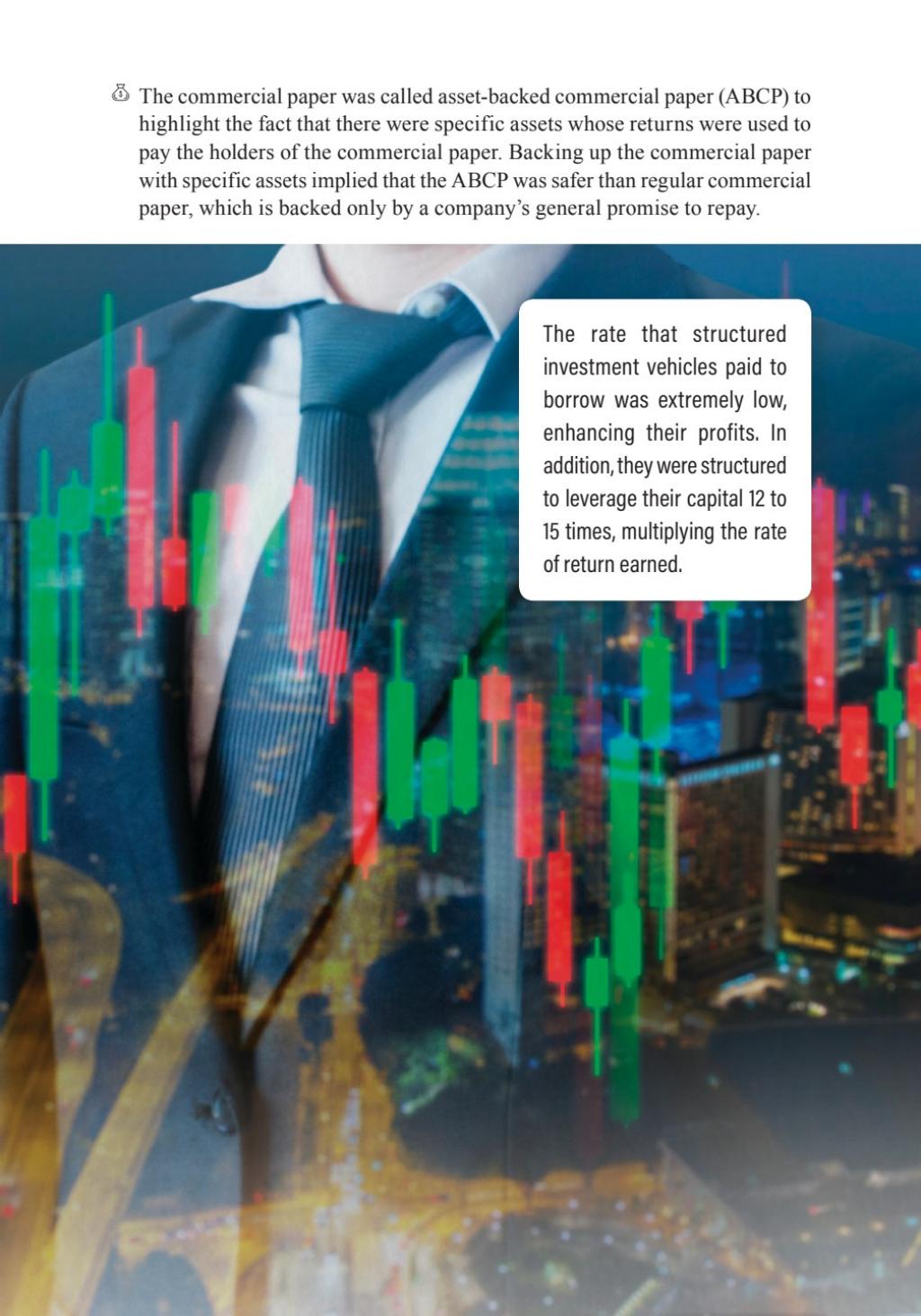
RUNS ON FINANCIAL INSTITUTIONS

- ⌚ Until now, the huge surge in demand for mortgage securities—and a newer product known as collateralized debt obligations (CDOs), which pooled mortgage securities into even larger investment pools—meant that the mortgage-lending machine had to find more and more borrowers to take out loans that could be securitized.
- ⌚ And the only way to do that was to lower standards. Lowering loan standards at the start of the process would inevitably lead to a rise in defaults, but the beauty of the originate-to-distribute model was it would be someone else's problem.
- ⌚ The first indication that there was a large-scale problem occurred in March 2007, when a subprime lender named New Century folded. New Century was a wholesale lender whose business consisted of borrowing on a short-term basis from banks and then passing the funds on to mortgage brokers that originated subprime loans on its behalf. New Century would then sell the mortgages to mortgage pools, which in turn created subprime CDOs.
- ⌚ But mortgage pool managers had the right to return to New Century any loans that defaulted within a few months of their purchase. And in early 2007, the return rate rose dramatically. As a result, the banks that lent money to New Century refused to make any more loans to the company, and it failed after it couldn't find new sources of credit. This was the first run on a financial institution associated with the crisis.
- ⌚ Even the failure of New Century didn't mean that all subprime loans were bad. But the increased default rate on mortgages caught the attention of the credit raters that had awarded triple-A and other investment-grade ratings to hundreds of subprime MBSs.
- ⌚ In May 2007, Moody's placed 62 bonds from 21 different subprime securitization deals on review for potential downgrades. This was an important event because once a rating firm offers an initial rating, it changes its evaluation only after significant additional evidence surfaces that the scoring needs to be changed. The fact that Moody's had placed so many of these bonds on review was a signal of how bad the 2006-vintage default problem appeared to be.

- ⌚ Ideally, investors would have been able to learn which specific mortgages in what specific subprime MBS were going bad. That would have helped them identify the securities still worth holding, and it might have revealed other information that could have helped them forecast any securities that were likely to have problems in the future.
- ⌚ But this information was either hard to get or impossible to get and sometimes didn't exist at all. Thus, there was a huge information gap at the center of the subprime problem.
- ⌚ Most investors didn't have granular enough information to judge between different subprime securities offerings, which might vary considerably in quality. In these situations, the best thing to do was to run away from any asset connected to subprime mortgages, and that's basically what the sophisticated investors attempted to do—in larger and larger numbers—throughout the summer of 2007.
- ⌚ The most significant early run involved an offshore funding mechanism called a structured investment vehicle (SIV). Large banks and others established the SIVs as funding conduits to roll up large numbers of asset-backed securities, predominantly mortgage-backed ones, into much larger CDOs. Investments backed by the CDOs would then be offered to investors.
- ⌚ The banks that sponsored the SIVs were careful to establish them as independent entities. Yet the banks remained part owners and therefore entitled to a share of the SIV's profits.
- ⌚ SIVs borrowed money by issuing commercial paper—that is, short-term debt with a maturity of less than 9 months and usually 1 to 3 months. They then invested the borrowed money in asset-backed securities, such as subprime MBSs.
- ⌚ They did this to engage in a form of interest rate arbitrage. Commercial paper had low interest rates whereas subprime MBSs, for example, earned much higher rates. So, the SIV earned a spread between the rate it paid to commercial paper investors and the rate it earned on the subprime MBS.

Michael Lewis's book *The Big Short: Inside the Doomsday Machine*—and the movie that was based on it—tells the story of investors who sold subprime mortgage-backed securities short. They basically borrowed and sold these securities at today's high price and then bought the mortgage pools back at tomorrow's distressed values.

- ⌚ The commercial paper was called asset-backed commercial paper (ABCP) to highlight the fact that there were specific assets whose returns were used to pay the holders of the commercial paper. Backing up the commercial paper with specific assets implied that the ABCP was safer than regular commercial paper, which is backed only by a company's general promise to repay.



The rate that structured investment vehicles paid to borrow was extremely low, enhancing their profits. In addition, they were structured to leverage their capital 12 to 15 times, multiplying the rate of return earned.

- ⌚ Once the news of high default rates in the mortgage loans underlying subprime CDOs began to spread through the markets in the fall of 2007, the holders of the ABCP realized they were holding a much riskier investment than they'd bargained for. So, as the paper matured, investors began to refuse to reinvest in it. This essentially constituted a run on the SIVs.
- ⌚ This was one of the most important events of the subprime meltdown—first because the amounts involved were huge (the SIVs held hundreds of billions of dollars' worth of assets). In addition, the banks involved included some of the world's largest and most important.
- ⌚ Even though the SIVs were technically independent of the banks that had set them up, it was widely known in the financial markets who had sponsored which SIV, and bank reputations would suffer tremendously if they let their creations fail.
- ⌚ And that would happen to the SIVs if they couldn't find a way to deal with the run on the commercial paper they had issued. They would either have to find new investors—which was highly unlikely, given the sudden change in sentiment toward subprime MBSs—or liquidate parts of their portfolios to pay off their investors. But again, given that all subprime MBSs were highly suspect, any sale would only be possible at fire-sale prices. In this case, the market value of the subprime MBS would almost certainly fall below the amount owed to the commercial paper holders and the SIV would become insolvent.
- ⌚ The organizers of the main American SIVs approached the US Treasury in October 2007 to organize a private bailout. In the end, each bank that sponsored one or more SIVs bailed them out by purchasing the SIV's assets in November and December 2007.
- ⌚ Many of the world's largest banks were now holding hundreds of billions of dollars of subprime MBSs, whose quality was deteriorating by the day. This drastically weakened the banks, leading many investors to question their financial health.

DOWNGRADES AND DISTRESS

- ⌚ In October 2007, the downgrades that Moody's and other bond rating agencies had been warning about finally happened. Many subprime mortgage securities and CDOs were downgraded from triple-A to single-C in one day. With the ensuing technical defaults on billions of dollars' worth of subprime securities that were triggered, any subprime was now officially a toxic asset. And the best way to deal with it was to get as far away as you could.
- ⌚ But everyone in the financial markets was involved with subprime either directly or indirectly, and nobody knew for sure exactly how deeply anyone was mired in the situation or how great were the losses any institution could sustain before it was truly in trouble. Eventually, though, investors learned enough about certain institutions to convince them to demand their money back.
- ⌚ The investment bank Bear Stearns was the first of the big names to experience this squeeze. Bear had large exposures to subprime, including direct investments as well as sponsoring hedge funds that had invested in subprime. To fund these investments, Bear Stearns needed to borrow money—and a lot of it—from outside investors.
- ⌚ This borrowing was no problem when the markets were booming, but now Bear's lenders started to get nervous. In March 2008, Goldman Sachs expressed concerns over Bear's ability to repay them, and this led to another modern version of a bank run.
- ⌚ Faced with Bear Stearns' imminent collapse, which would almost certainly have caused greater market panic, the Fed came to the rescue in the form of a government-coordinated, and mostly private, bailout. JPMorgan Chase agreed to buy Bear for a meager \$2 a share. That immediately calmed the markets.

After October 2007, the new term superdowngrade—a downgrade from rating agencies of at least 3 notches at once—entered the financial lexicon.

- ⌚ But while the Bear Stearns rescue prevented a panic, it didn't do anything to stop the underlying problem. Market players had by now lost confidence in each other's solvency and their ability to repay debts due to the widespread exposure to toxic assets.
- ⌚ However, Bear's rescue might have set an expectation that any other institution falling victim to a run would also receive government assistance. This expectation was validated on September 6, 2008, when Fannie Mae and Freddie Mac were taken into government conservatorship as they spiraled toward insolvency—both of which had purchased hundreds of billions of subprime CDOs.
- ⌚ It was no surprise that Lehman Brothers was the next financial institution headed for distress. Many people knew that the investment bank had basically bet the company on the mortgage business. They had huge exposures to all aspects of the subprime lending process. By September 2008, investors were running away from Lehman just as they had run away from the SIVs, Bear, Fannie and Freddie, and many other institutions with too much exposure to subprime.
- ⌚ The markets were oddly calm, though, because of the confidence that the Fed would once again arrange an unsightly but necessary shotgun wedding between Lehman and some other large bank. So, when the word came out on September 15, 2008, that there was no deal—and Lehman was declaring bankruptcy—the panic that had been held in check was finally unleashed.
- ⌚ This was the critical moment—and critical mistake—that led to the near-collapse of the broader market. The government's decision to let Lehman fail basically communicated to everyone that they were on their own and that their only hope was to run on every financial institution that they did business with.
- ⌚ For the first time in decades, the largest banks simply refused to lend to each other, and nobody would buy anyone's securities at any price. This is how the financial crisis jumped beyond the markets and caused a deep recession in the overall economy.
- ⌚ Nearly every large financial institution in the United States and in many other developed countries found itself vulnerable to the runs that had destroyed

Lehman and the SIVs. Governments used emergency powers to funnel cash to the banks. Many of the major US investment banks were forced to become bank holding companies so that they became eligible for discount-window assistance from the Fed.

- ⌚ Although this halted the active runs on their institutions, it didn't put an end to the feeling of panic. Investors still didn't know how large anyone's exposures were to subprime MBSs and whether they would be able to stay solvent as these toxic assets dropped further in value.
- ⌚ Fortunately, the Fed came up with a plan to take away the motivation for the runs: It would conduct stress tests on all large financial institutions that would show exactly how much those institutions stood to lose if conditions continued to worsen. The Fed also promised that the institutions whose solvency was in doubt would be forced to raise additional funds so that they could withstand any losses foretold by the stress tests.
- ⌚ In early 2009, the Fed conducted the first of what has become annual stress tests on large financial institutions. Most institutions showed that they were strong enough to withstand still more losses, and none had to raise a significant amount of additional capital.
- ⌚ Finally, the information problem that had been driving one of the greatest bank runs of all time was resolved. But the damage was done. The United States plunged into the worst recession since the Great Depression. It would take nearly a decade to fully recover.

SUGGESTED READING:

Lewis, ed., *Panic!*, part IV.

United States Financial Crisis Inquiry Commission, *Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States*.

QUESTIONS TO CONSIDER:

1. Many observers point out that securitization—and, in particular, the originate-to-distribute model of securitization—is the real culprit behind the subprime crisis. A good discussion of this model can be found here: <https://www.ecb.europa.eu/pub/pdf/other/incentivestructureoriginatedistributemodel200812en.pdf?d4e24fdaf559694a836c7f5f1128a5c>. Do you agree that this model of securitization was more important than the riskiness of the underlying mortgages in explaining the origins of the crisis? What are the incentive problems created by the originate-to-distribute model? Are there ways to securitize mortgages that do not run into these problems? (Hint: A search using the term “covered bond” may be helpful.)
2. Some authors, such as Mervyn King and Perry Mehrling, believe that one answer to future runs of the sort that took place during the subprime crisis is for the Federal Reserve and other central banks to become “dealers of last resort”; that is, central banks need to stand ready to buy assets from financial institutions to provide them the cash to prevent or mitigate a system-wide run. The idea is that the lender-of-last-resort function may not work in situations like the subprime crisis, when financial institutions don’t trust the quality of each other’s assets and hence will not lend to each other. Do you think that this is a good idea? For more information on this proposal, read Mervyn King’s *The End of Alchemy: Money, Banking, and the Future of the Global Economy* or Perry Mehrling’s *The New Lombard Street: How the Fed Became the Dealer of Last Resort*.

CHINA'S SHADOW BANKS

LECTURE 24

China's domestic financial system didn't suffer contagion effects in 2008, or during earlier economic brushfires around the world, because it was largely closed off. But China isn't less susceptible to crashes and crises than any other country. Thanks to its capital controls, any problems will be largely home-grown—but that's reason enough to worry. In recent years, a new type of home-grown financial institution has become key to the Chinese financial system and economic growth. China's shadow banks—and the tremendous expansion of credit that they've contributed to—have many observers worried that China will be the next big economy to experience a major financial meltdown.

SHADOW BANKING

Shadow banking is the provision of services traditionally performed by banks, such as taking deposits and making loans, by institutions that aren't banks or aren't recognized as banks.

The financial services that fall under the rubric of shadow banking are nothing more than normal borrowing, lending, and investing activities. The companies that perform these services are not banks, in a strict sense, but they do engage in legitimate businesses.

The reason these activities are called shadow banking has to do with regulation. Banks are some of the most highly regulated businesses in the economy, and these regulations can really eat into a bank's profits by forcing its managers to hire lawyers, accountants, and financial experts to ensure that the bank is complying with all laws and rules.

But because shadow banks aren't banks, they're usually regulated much more lightly, and in many instances, they're not really regulated at all. Therefore, shadow banking often arises to take advantage of gaps in financial regulation—especially where banks are very tightly regulated but where the regulations for other types of institutions aren't very developed.

When shadow banking is used primarily to escape or avoid regulations, this almost always leads to problems.

SHADOW BANKING IN CHINA

- ⌚ The mortgage meltdown centered in the United States didn't directly affect China, but the deep recession that followed did, as US demand for Chinese exports dropped significantly. Exports are the main driver of the Chinese economy, accounting for more than half its gross domestic product (GDP), so the big drop in aggregate demand in the United States, Europe, and other economies threatened to significantly reduce economic growth in China.
- ⌚ And the Chinese government prizes high and consistent economic growth above all other economic goals. At the time of the Great Recession, the Chinese government's stated goal was to ensure that economic growth was at least 7.5% per year after inflation.
- ⌚ Achieving this was important to the Chinese government because it was viewed as helping to maintain domestic political stability. When the Chinese economy grows at a high rate, it can absorb all the new workers that enter the labor market each year. And the standard of living increases, even in remote rural areas, which helps keep people optimistic and happy with the government.
- ⌚ So, when faced with the possibility that economic growth would fall well below its target in 2009, the Chinese government undertook what is probably one of the largest stimulus programs in recorded history. Government spending increased by more than \$500 billion. This was smaller, in absolute terms, than the \$880 billion fiscal stimulus in the United States, but it was still close to 20% of Chinese GDP.
- ⌚ The fiscal stimulus was accompanied by a monetary stimulus that was also massive. Under the guidance of China's central bank, bank loans nearly doubled in volume in 2009. Many of China's largest banks are owned by the government, which gives the government the right to tell them what to do, at least to a significant extent.
- ⌚ Still, the tremendous increase in bank lending must have surprised even the government, because the next year, concern over a possible recession was displaced by the concern that bank lending had grown much too quickly and could lead to bad loan problems at the banks. So, the government reversed its policy and placed caps on bank lending.

- ⌚ Even so, the one-time stimulus wasn't necessarily sufficient to keep China growing at its 7.5% target rate. What if the economy needed an additional push? The answer the government turned to was shadow banking.

CHINA'S TRUST COMPANIES

- ⌚ Shadow banks had existed in China for decades but remained small—estimated to be about 5% of the financial system in 2008. The most common type of shadow bank in China at the time was called a trust company, which was really more like what Americans would call an investment bank. Their primary role in the financial markets was to help arrange financing for projects considered too risky for the banks to lend to.
- ⌚ The Chinese financial system gave borrowers and lenders alike plenty of incentives to develop shadow banking. The state-owned banks—the largest ones in the country—primarily concentrated on making loans to other state-owned companies. They mostly ignored private companies, especially smaller ones. So, there was plenty of pent-up demand for loans that shadow banks could potentially satisfy.
- ⌚ In addition, all bank loan and deposit rates were controlled by the central bank, the People's Bank of China, and deposit rates were kept artificially low so that the banks would remain solidly profitable and keep funneling resources to the state-owned companies. For disgruntled depositors, shadow banks were a potentially attractive alternative.
- ⌚ After the explosion in traditional bank lending in 2009, the People's Bank of China and other financial regulators became much more tolerant of shadow banking. So, while traditional bank lending slowed down dramatically in 2010, shadow lending ramped up—doubling between 2010 and the end of 2012 to about \$6 trillion, close to half the amount of total bank loans made. And despite repeated government attempts to slow down the sector, shadow lending continued to grow at close to an annual rate of 30% between 2014 and the end of 2016.
- ⌚ Much of the lending involves the Chinese trust companies. One way they make loans is to offer high-yielding accounts to wealthy investors and then basically plow this capital into business loans. The minimum size of these investment accounts is a million yuan, or about \$150,000.

- ⌚ Trust companies also make another type of loan, in cooperation with the banks, called wealth management products (WMPs), which are much like mutual fund accounts or other investment products that many American banks offer to their depositors. Promised returns on the WMPs are quite high—often in the range of 8% to 10%—so they’re a magnet for investors who want to earn more than the extremely low rates on bank deposits.
- ⌚ A bank collects the WMP funds and passes them to a trust company that lends to other businesses. The banks find this attractive for 2 reasons:
 1. They often own the trust company that they are passing the funds to, so the more the trust company earns, the more the bank does.
 2. If the bank offers a WMP and makes a guarantee—for example, by pledging that the customer won’t lose any money on the investment—then the bank has to count the WMP as if it were its own investment and hold capital reserves against it. But if the bank doesn’t guarantee the WMP, and makes this clear to the customer, then the bank is seen as acting as a middleman and doesn’t have to hold any capital reserves against the product. Thus, if the bank owns the trust company, it can participate in the profits from the WMP and face very low costs.
- ⌚ But why are individual savers so enthusiastic about WMPs if they could lose money? The truth is that even though the banks and trust companies say that these products aren’t guaranteed, the guarantee is usually implicit; that is, if a WMP incurs losses, then the trust companies often pay back their customers out of their own pockets.
- ⌚ In addition, most people don’t believe the bank when it claims that it won’t be responsible for any losses. Why would the banks let the trust companies they own go bankrupt? People also expect the Chinese government to bail out a bank that gets into trouble because of a trust company it owns, and this belief tends to be correct.
- ⌚ Given what you’ve learned about Chinese shadow banking so far, it might not sound so bad. After all, the trust companies are providing a more direct way for individuals to invest their savings and giving them the opportunity to earn higher returns. On the other hand, the relationships between banks and trust companies look a little suspicious.

- ⌚ If the bank owns the trust company, then it's probably true that the bank can also tell the trust company who to lend to—and who not to lend to. From this perspective, the WMPs start to look like bank loans that don't count as such, purely on a technicality. And the sleight of hand with respect to whether the WMPs are guaranteed, and if so by whom, should make you nervous.

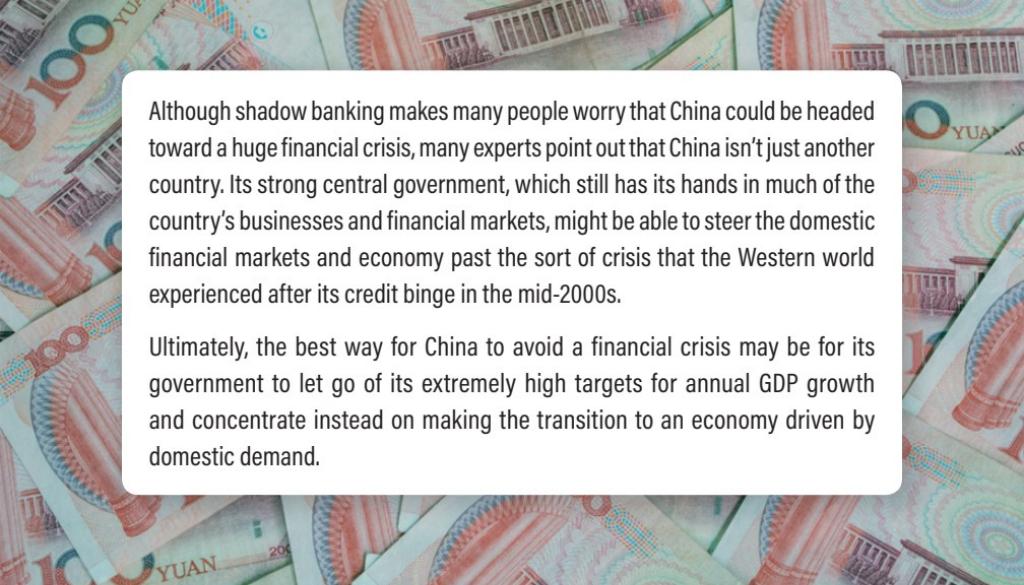
CHINA'S RAPID CREDIT GROWTH

- ⌚ Shadow banking in China enabled the credit party to keep on rolling—with much of it still funded by the banks, despite the government's wishes. And this is one of the big dangers of shadow banking. It facilitated dangerously rapid credit growth.
- ⌚ The best way to show the size of the credit supply is to compare the amount of unpaid loans in the economy to GDP—in other words, to calculate the credit-to-GDP ratio. This scales the amount of credit by the size of the economy and lets us compare the amount of credit and its growth across countries.
- ⌚ At the end of 2008, China's credit-to-GDP ratio was 125%, which was relatively low compared to other large economies. But by the end of 2013, the ratio was 216%. And by the end of 2016, it was 260%.
- ⌚ So, the credit-to-GDP ratio was growing at a phenomenal rate. Economists have learned that if this ratio rises too quickly, it's a reliable predictor of future trouble in the form of a banking crisis. The idea is that if the amount of credit outstanding rises much more quickly than GDP, then the quality of lending deteriorates significantly and bad loans will eventually pile up in the system, causing widespread bank failures.
- ⌚ This describes what happened in the United States, the United Kingdom, and other developed countries in the early 2000s. The rate of increase in China's credit-to-GDP ratio is comparable—if not higher than—the commensurate rise in the United States during the years leading up to the subprime meltdown. These facts are a big part of what makes many observers of financial markets nervous about China.
- ⌚ If we dig deeper into the uses of the loans—and into some of the other types of shadow banking in China—the story becomes even more ominous.

- ⌚ One big recipient of these loans is the industrial sector, which borrows to invest in more capacity or, in many cases, just to keep the factories running. One unfortunate consequence of the lending binge is that Chinese companies kept investing in more capacity in the face of sluggish economic growth in the rest of the world.
- ⌚ While the investment takes place, it keeps people employed, but once the factories are built, there aren't enough customers to buy the products. Overcapacity in China is so severe that it might be one of the main factors that kept inflation unexpectedly low in much of the world after the Great Recession.
- ⌚ The Chinese are well aware of the overcapacity, but they also realize that it will take years—if not decades—to convert their export-driven economy to one driven by domestic demand, as in the United States and Europe. In the short run, China's need to deliver high economic growth means that loans need to keep flowing into building additional factories.
- ⌚ Shadow lending might also be a way for many floundering companies in China to stay afloat and to prop up the banks that loaned them money. Reportedly, many shadow loans are being made to companies that simply use the funds to repay older bank loans. The banks then often make new loans to the same companies, enabling them to continue to limp along for a while.
- ⌚ These 2 phenomena—continued investment in overcapacity and new loans to pay off old loans—have changed the relationship between credit and GDP growth in China.
- ⌚ In the past few years, the amount of GDP growth attributable to each dollar loaned has fallen by about a third. This means that the investments funded by the loans aren't as productive as they used to be. And this shows how the story previously described is playing out in the Chinese economy.
- ⌚ Fast credit growth leads to deterioration in loan quality, both because of the low returns from investing in overcapacity and the fact that many loans aren't being used for new investment but to pay back old loans. Yet the lending game is so attractive that many Chinese companies find it more profitable to lend out their own money than to use it to produce products or grow their businesses.

- ⌚ A big part of shadow lending in recent years has consisted of so-called entrusted loans, which are made from one nonfinancial company to another. Often, banks are involved as agents, which means that the bank will scout out potential borrowers for companies that have money to lend and help take care of the loan paperwork and collect payments for the lender.
- ⌚ One of the biggest recipients of entrusted loans is the property-development business, resulting in a boom in residential construction throughout the country.
- ⌚ In some places, especially smaller cities in the interior of China, there has been such an overexpansion of building that “unborn cities” appeared, in which dozens of brand-new apartment towers were built with hardly any families living in them.
- ⌚ In other places, especially the largest cities on the coast, lending has fueled a huge increase in housing demand and caused real estate prices to soar. So, a real estate bubble is yet another potential danger in the market. Families in China’s major cities are scrambling to purchase multiple apartments to provide homes for their children and for investment purposes.
- ⌚ In the first half of 2016, more than a third of all new loans in China went into housing, and some estimates hold that more than half of all property sales in China are purely for investment. All of this activity pushed apartment prices way up.
- ⌚ One possible limit on a housing bubble in China is that lenders still require down payments of 30% or more. But more and more borrowers are finding that the money they need for their down payments is available from the shadow lenders—in this example, online peer-to-peer lenders.

In Shanghai, the average home price was more than 30 times the average income in the city in 2016. In New York City, in contrast, the average home cost 12 times the average income.



Although shadow banking makes many people worry that China could be headed toward a huge financial crisis, many experts point out that China isn't just another country. Its strong central government, which still has its hands in much of the country's businesses and financial markets, might be able to steer the domestic financial markets and economy past the sort of crisis that the Western world experienced after its credit binge in the mid-2000s.

Ultimately, the best way for China to avoid a financial crisis may be for its government to let go of its extremely high targets for annual GDP growth and concentrate instead on making the transition to an economy driven by domestic demand.

SUGGESTED READING:

Dollar, “The Rise and Fall of Shadow Banking in China.”

Hsu and Li, *The Rise and Fall of Shadow Banking in China*.

QUESTIONS TO CONSIDER:

1. This paper on shadow banking and regulation—<http://www.imf.org/external/pubs/ft/fandd/2017/03/chami.htm>—argues that financial innovation doesn't necessarily lead to crisis. Rather, the mixture of incompatible types of risk inside an institution creates the danger of financial disaster. Do you agree with this argument? What examples from this lecture or other cases of shadow banking can you recall in which there is risky mixing of incompatible types of risk?
2. Banks are some of the most highly regulated businesses, which helps explain the popularity of shadow banks. Given that many shadow banking institutions come into existence precisely to avoid regulation, what approach should policy makers take toward regulating shadow banks? What should determine how tightly a shadow bank is regulated? Is it even possible to regulate shadow banks?

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Amyx, Jennifer A. *Japan's Financial Crisis: Institutional Rigidity and Reluctant Change*. Princeton, NJ: Princeton University Press, 2004.

This book gives an excellent analysis of the Japanese banking crisis from the perspective of political economy and in particular the culture of Japanese economic and financial regulation. The author goes into fascinating detail about how the regulatory system functioned in Japan and how financial deregulation in Japan and the rest of the world caused this system to fail in key ways that contributed to the crisis.

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This working paper is an extended version of a chapter these authors wrote for the International Monetary Fund's semiannual *World Economic Outlook*. It gives a very good overview of the types of financial crises and summarizes what economists have learned about the causes of currency crises. Although the paper is a bit old, its findings remain valid predictors about the danger signals for currency crises.

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This book is an excellent source on the personalities behind both the South Sea and the Mississippi bubbles, and it covers both. It tries to be a cultural as well as economic history of the period—and tries a bit too hard to draw parallels to the dotcom bubble of the late 1990s—but is a valuable source of insight into the social environment and the people who created the bubbles.

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Barth is one of the leading experts on the savings and loan crisis, and he shows exactly why the crisis deserves the label “debacle” in this book.

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An excellent book that focuses on a cross-country analysis of inflation and hyperinflation and gives very clear explanations on the causes and common characteristics of this phenomenon. It includes many historical examples.

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Black was an official in the Federal Home Loan Bank System during the savings and loan crisis, and his experiences inspired him to go back to school to become a criminologist with a focus on financial crime. He constructs a convincing case in this book that control fraud committed by managers of savings and loan associations played a much more important role in the savings and loan crisis than the standard narratives of the crisis claim. Because this book was published nearly a decade after the crisis was resolved, it also has the benefit of hindsight relative to most of the other major works written on this crisis.

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Cassidy tells the story of the internet as well as the dotcom stock boom of the 1990s, focusing on the people as well as the companies. This author is more objective than many others who wrote on the internet boom and bubble. In addition, Cassidy includes a data appendix containing a chronological list of all the dotcom initial public offerings and their fates.

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This ambitious but highly readable work discusses several generations of the Morgan family and how its members built their companies into elite international financial institutions. The book has an excellent, if somewhat too sympathetic, coverage of J. P. Morgan's role in dealing with the panic of 1907.

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Jorion is one of the world's leading experts on risk management. He was living in Southern California when Orange County went bankrupt and decided to write this entertaining and informative book about how Robert Citron's investment strategy led to the county's bankruptcy.

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Lewis, Michael. *Flash Boys: A Wall Street Revolt*. New York: W. W. Norton & Company, 2014.

Lewis has written many entertaining and provocative books about important events and people in finance. This book takes on the world of computerized, high-frequency, and algorithm-driven trading, showing some of the potential problems and pitfalls of this practice.

Lewis, Michael, ed. *Panic! The Story of Modern Financial Insanity*. New York: W. W. Norton & Company, 2009.

This book is actually a set of anthologies of articles written at the time of several modern financial crises, beginning with the crash of 1987. It is a great way to get different perspectives in a compact form. Each chapter contains articles about a different crisis.

Lowenstein, Roger. *America's Bank: The Epic Struggle to Create the Federal Reserve*. New York: Penguin Press, 2015.

Lowenstein is an outstanding writer on financial topics, and this recent book on the creation of the Federal Reserve is an excellent work that blends history and economic analysis. This book will help the reader understand the attitudes of bankers and the general public toward the role of the government in the money supply around the turn of the century. Lowenstein also gives a very good description of the panic of 1907.

———. *When Genius Failed: The Rise and Fall of Long-Term Capital Management*. New York: Random House, 2000.

Lowenstein is one of the best popular writers on financial markets and financial economics. This telling of the Long-Term Capital Management story gets deep into the personalities involved in the fund while still conveying the essence of the technical and financial details that are critical to understanding why the fund ran into trouble. It remains the best source on this affair.

Mason, David L. *From Buildings and Loans to Bail-Outs: A History of the American Savings and Loan Industry 1831–1995*. New York: Cambridge University Press, 1995.

This book gives both a detailed history of the building and loan association, which was the forerunner of the savings and loan association, as well as a detailed history of how the savings and loan crisis was resolved.

McCallum, John S. “On Portfolio Insurance, the Stock Market Crash, and Avoiding a Repeat.” *Business Quarterly* 53, no. 2 (Autumn 1988): 46–51.

This article gives reasons for the large increase in stock prices in 1987 and reviews some of the events that may have made the market start to decline in October 1987.

Mikitani, Ryoichi, and Adam S. Posen, eds. *Japan's Financial Crisis and Its Parallels to U.S. Experience*. Institute for International Economics: Special Report 13. Washington, DC: Institute for International Economics, 2000.

This is a collection of papers written by many famous US and Japanese economists about the Japanese banking crisis. Several papers explore aspects of the Japanese banking crisis, such as the convoy system, in greater detail, while others examine interesting related questions, such as a comparison of the Japanese crisis with the United States' savings and loan crisis.

Montiel, Peter. *Ten Crises*. New York: Routledge, 2014.

Montiel is an excellent international economist, and in this book he analyzes individual currency crises but also gives a good discussion of how economists' understanding of the causes of crises has evolved. Some material is a bit academic and can be skimmed without losing the thread of Montiel's arguments, but the introduction and conclusion are worth reading closely.

Morris, Charles R. *A Rabble of Dead Money: The Great Crash and the Global Depression—1929–1939*. New York: Public Affairs, 2017.

Morris uses a mixture of specific cases or anecdotes and a critical review of academic research on the economic history of the 1920s and 1930s to put together a narrative of the boom of the 1920s, the crash of 1929, the slide into the Great Depression, and the recovery. He presents many specific stories about this era that help readers understand the uneven economic boom of

the 1920s and the economic collapse afterward. The treatment of the crash of 1929 isn't extensive but does help fill in details of the story omitted in other sources.

Moysich, Alane, "The Savings and Loan Crisis and Its Relationship to Banking." Chapter 4 in *History of the Eighties: Lessons for the Future*, vol. 1. Washington, DC: Federal Deposit Insurance Corporation, 1997.

This concise discussion of the history of the savings and loan crisis does a good job of highlighting some of the problems of regulation that were specific to the Federal Home Loan Bank System and also discusses in detail the problems with commercial real estate lending that were a main factor in many savings and loan association failures. The book contains many good tables and graphs as well. Readers interested in comparing the fates of savings and loan associations with commercial banks should also read other chapters in this book to see how commercial banks experienced similar problems and how the FDIC handled them.

Murphy, Antoin. "John Law: Aspects of His Monetary and Debt Management Policies." In *Great Bubbles*, vol. 2, edited by Ross B. Emmet, 258–271. London: Pickering & Chatto, 2000.

This is a reprint of an academic article on John Law that is a concise and readable summary of some of Law's main ideas from "Money and Trade Considered" (an entry in this bibliography). This article will help the reader understand how Law envisioned that his land bank would work and will also help the brave reader decipher some of the more difficult ideas in "Money and Trade Considered."

Narayanan, Arvind, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. *Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction*. Princeton, NJ: Princeton University Press, 2016.

This is a technical yet surprisingly accessible description of how Bitcoin works, including all of its potential limitations and weaknesses. The book also discusses how many newer cryptocurrencies, or altcoins, are related to Bitcoin and use variations of the mechanisms used in the Bitcoin protocol. The book also contains a very good introduction to Ethereum and discusses the characteristics that distinguish it from Bitcoin and other altcoins.

Nash, George H. *The Life of Herbert Hoover: The Engineer, 1874–1914*. New York: Norton and Company, 1983.

This is the first volume of an extensive biography of President Herbert Hoover. His lack of success in dealing with the onset of the Great Depression unfortunately overshadows much of his talent, including as an engineer and businessman. This volume includes his early career as a mining engineer and details his involvement with mines and mining companies, including the stock scandal that nearly derailed his career.

New York Times. “The Brady Report: Dissecting the Trading.” January 11, 1988, p. D9. <https://www.nytimes.com/1988/01/11/business/brady-report-dissecting-trading-unsettling-signs-then-sweeping-selloff-october.html>.

This article summarizes the US government’s report on the crash of 1987 and gives a good overview of its main findings. It also provides key details about how and why the crash unfolded.

Overdahl, James, and Barry Schachter. “Derivatives Regulation and Financial Management: Lessons from Gibson Greetings.” *Financial Management* 24, no. 1 (Spring 1995): 68–78.

This article reviews several of the swaps between Bankers Trust and Gibson Greetings in detail and gives an indication of the variety of ways that Bankers Trust used its expertise to create convoluted and opaque swaps.

Partnoy, Frank. *The Match King: Ivar Kreuger, the Financial Genius behind a Century of Wall Street Scandals*. New York: Public Affairs, 2009.

This is a biography of Ivar Kreuger that focuses on his activities through the 1920s and up to his death. It is well researched and has a substantial bibliography for those interested in further reading on Kreuger.

Paul, Helen J. *The South Sea Bubble: An Economic History of Its Origins and Consequences*. New York: Routledge, 2011.

This recent work on the South Sea bubble looks for rational economic reasons for the rise in the South Sea Company’s shares and fills in historical background on the company. It is a good complement to other works on the South Sea bubble that emphasize the irrational mania explanation of the bubble.

Plazak, Dan. *A Hole in the Ground with a Liar at the Top: Fraud and Deceit in the Golden Age of American Mining*. Salt Lake City: University of Utah Press, 2006.

This book demonstrates the abundance and breadth of mining frauds in America, especially during the late 19th and early 20th centuries. The book contains a chapter on George Graham Rice as well as histories of many other fascinating swindlers who preyed on people's hopes for buried treasure.

Posthumus, Nicolaas Wilhelmus. "The Tulip Mania in Holland in the Years 1636 and 1637." In *Great Bubbles*, vol. 2, edited by Ross B. Emmet, 92–128. London: Pickering & Chatto, 2000.

This is a reprint of an early academic paper that tells the standard story of the tulip bubble. It focuses on the “mania” story of the bubble but also gives good historical details on the trade in tulips and the government’s response to the bubble. In addition, this article contains translations of several primary documents that were written during or shortly after the tulip bubble.

Presidential Task Force on Market Mechanisms. *Report of the Presidential Task Force on Market Mechanisms*. Washington, DC: US Government Printing office, 1988. <https://ia802605.us.archive.org/0/items/reportofpresiden01unit/reportofpresiden01unit.pdf>.

Also known as the Brady Report, this is a detailed account of what happened during the crash of 1987 that helped point out the portfolio insurance and index arbitrage activities that contributed significantly to the crash.

Rebonato, Ricardo. *Plight of the Fortune Tellers: Why We Need to Manage Financial Risk Differently*. Princeton, NJ: Princeton University Press, 2007.

Rebonato is one of the best minds in risk management, and he is an excellent writer. This book discusses risk management from first principles, helping the reader understand why we need to manage risk and why it is so difficult. Most of this book is devoted to understanding the value at risk model, both its strengths and weaknesses. And he suggests how to deal with the problems of this model in a clear and straightforward way.

Reinhart, Carmen M., and Kenneth S. Rogoff. *This Time Is Different: Eight Centuries of Financial Folly*. Princeton, NJ: Princeton University Press, 2009.

This is a truly comprehensive study of the major types of financial crisis: bank panics, currency crises, and sovereign defaults. Although the book is

written more for an academic audience, it is readable and full of graphs, tables, and visual evidence that gives a good understanding of how common financial crises have been throughout most of history.

Sapsford, Jathon. "It's Japan's Paradox: Troubled Banks Buoy Their Ailing Borrowers." *The Wall Street Journal*, July 7, 1998, p. A1.

Sapsford wrote many excellent articles for *The Wall Street Journal* about the Japanese banking crisis as it unfolded in the late 1990s. This particular article explains how Japanese banks hid the amount of bad loans by nursing along their customers, ultimately making the problem worse when these practices finally became unsustainable.

Smith, Randall, Steve Swartz, and George Anders. "Black Monday: What Really Ignited the Market's Collapse After Its Long Climb." *The Wall Street Journal*, December 16, 1987, p. A1.

This is an early view of how and why the crash of 1987 happened. It gets many of the details correct, but later articles tend to present a more complete picture of this crash.

Thornton, T. D. *My Adventures with Your Money: George Graham Rice and the Golden Age of the Con Artist*. New York: St. Martin's Press, 2015.

This book is a biography of George Graham Rice that is based in part on his own autobiography of the same name, augmented by much historical research. It tells his story well without being excessively sympathetic to him.

United States Financial Crisis Inquiry Commission. *Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States*. Washington, DC: Government Printing Office, 2011.

This is a comprehensive look at why the subprime meltdown occurred in the US and whether the policy responses to the crisis were effective.

United States Senate Permanent Subcommittee on Investigations. *JPMorgan Chase Whale Trades: A Case History of Derivatives Risks and Abuses*. Washington, DC: Government Printing Office, 2013.

This is a lengthy but readable and complete examination of the London Whale trades. It gives key details about the actions taken by JP Morgan Chase traders and the risk-management failures that led to excessive risk taking and losses at the bank.

US Securities and Exchange Commission. “Investor Alert: Bitcoin and Other Virtual Currency-Related Investments.” May 7, 2014. <https://investor.gov/additional-resources/news-alerts/alerts-bulletins/investor-alert-bitcoin-other-virtual-currency>.

Investor.gov has abundant up-to-date information and links to other useful sources on cryptocurrencies. The website focuses on helping keep individual investors safe but is an excellent source of information about various cryptocurrency-related events and problems in the financial markets.

White, Lawrence J. *The S&L Debacle: Public Policy Lessons for Bank and Thrift Regulation*. New York: Oxford University Press, 1991.

This work was published while the savings and loan crisis was still in its final phase but presents the standard analysis of the elements that caused the crisis. As its title shows, many were already calling the crisis a debacle by 1991.

Wicker, Elmus. *The Banking Panics of the Great Depression*. New York: Cambridge University Press, 1996.

This book disputes many of the claims regarding the bank panics of the Great Contraction made by Milton Friedman and Anna Schwarz in *A Monetary History of the United States, 1967–1960* (an entry in this bibliography). The author gives more detailed explanations of each panic episode that occurred from 1930 to 1933 and argues that only the panic taking place in February 1933 was truly a nationwide bank panic. The author makes the case that the banking holidays declared by individual states were the mechanism that turned the failure of a large Detroit bank holding company into a nationwide bank panic.

Wigmore, Barrie A. “Revisiting the October 1987 Crash.” *Financial Analysts Journal* 54, no. 1 (January/February 1998): 36–48.

This article gives a good overview of the developments in the financial markets, especially the economic and regulatory events, that may have precipitated the decline in the stock market in October 1987 that subsequently became a market crash.

Williams, Michael. "Many Japanese Banks Ran Amok while Led by Former Regulators." *The Wall Street Journal*, January 19, 1996, p. A1.

This article tells several stories about the practice of *amakudari* and the role it played in the Japanese banking crisis. The article helps illustrate how the close relationship between regulators and the banking industry made the crisis worse.

Wilmsen, Steven K. *Silverado: Neil Bush and the Savings & Loan Scandal*. Washington, DC: National Press Books, 1991.

Although this brief but engrossing history of Silverado Savings and Loan mentions Neil Bush in its title and devotes a significant portion to his role in this scandal, it focuses more intently on Michael Wise, the president who drove Silverado's excessive growth and ultimate demise. The author seems rather sympathetic to Bush but correctly points out that Bush played only a minor role relative to Wise.

Wray, L. Randall. *Why Minsky Matters: An Introduction to the Work of a Maverick Economist*. Princeton, NJ: Princeton University Press, 2016.

The work of Hyman Minsky has long influenced the way people think about financial crashes and crises, and several of Minsky's ideas are discussed in this course. This book gives an overview of Minsky's ideas on financial crises as well as other aspects of economics, such as macroeconomics.

Zukoff, Mitchell. *Ponzi's Scheme: The True Story of a Financial Legend*. New York: Random House, 2005.

This is an entertaining biography of Charles Ponzi that reads like fiction, though the author painstakingly sourced every detail reported, including Ponzi's (and others') remarks, mainly from the press. The book extensively documents these sources and also includes a selected bibliography.

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